

# PLASTICS

## & MOLDED PRODUCTS

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### Contents

Sound Records and the Resinoids, by Charles W. Rivise .....	137
Blood Plastics Revival in Modern Form .....	140
Using Hair as a Plastic Material .....	141
A Low-Priced Plastic from Pulp or Asbestos .....	141
Utilization of Pyroxylon Plastic Waste .....	142
World's Recent Progress in Synthetic Resins, by Dr. Aladin .....	147
Cellulose Acetate Plastics, by Joseph Rossman .....	150
Technical Abstract Section .....	151

### MOLDED PRODUCTS—See Page 163

The Place of the Molded Handle, by Leon V. Quigley .....	163
Controlling Quality in Molded Products, by S. Pellerano .....	166
It Made You—And Is Waiting to Break You, by Benn C. Budd .....	165
A Historical Review of Pyralin, by W. E. Price .....	168
Three New Molded Devices .....	170
Molded Products and a Problem in Packing and Shipping .....	173
News of the Industry .....	174

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## Sound Records and The Resinoids

Contributions of the synthetic resins and plastics to the  
solution of the problem of permanent recording of sound

By Charles W. Rivise

THE research worker has always been on the qui vive to find new applications for the artificial plastics that would utilize their beneficial properties to the utmost. In many instances he has found it necessary or desirable to modify the composition of these materials in order to eliminate harmful and detrimental traits as well as to augment some valuable but undeveloped property or to bring out and fully develop some hitherto unsuspected latent quality. In some few cases he has even taken what had previously been considered a serious shortcoming of the resinoids and utilized it in such a manner as to render it a highly desirable property. The best example of this is the utilization of the light sensitivity of the artificial plastics, which is objectionable for most purposes, for the decoration of metallic and other surfaces as well as the preparation of photolithographic and printing plates, as has been described in some detail on page 319 of the June 1929 issue of *Plastics*.

The great majority of the applications of the resoids are due to the comparative ease with which they respond to initial heat and pressure to take on any one of an endless variety of

With the perfection of the disc record a generation ago, the art of sound recording and reproducing received a great impetus.

In Europe, the phonograph enjoys almost unprecedented popularity—despite radio.

In America the perfection of electrical reproducers for records and the great increase in the use of records for talking pictures and special broadcasts, have increased the requirements for records. Hence the present subject is timely.

shapes and configurations together with the fidelity and accuracy with which they reproduce even the most minute markings of the mold and the persistency with which they retain the impressed configuration after being subjected to a final heat and pressure treatment. Due to this remarkable and unique property a mass of loose molding powder or a preformed "biscuit" of compressed powder can be placed into a heated mold to first soften and fill the mold

under the initial application of heat and pressure and then to harden permanently into the exact shape of the mold under the further application of additional heat and pressure. It would be expected, therefore, that these materials would be eminently suitable for making permanent records of sound waves for future production on talking machines. In fact this was one of the very first applications suggested for the artificial plastics.

### First Casein Record

The first suggestion is contained in Patent 840,932 issued Jan. 8, 1907, to that notable pioneer in casein plastics, Byron B. Goldsmith, whose valuable contributions to the art of artificial plastics was discussed on Page 444 of the August, 1928 issue of *Plastics*. In this patent he discloses a sound record made of casein either alone or together with a converting agent or plasticizer and a suitable filler. The record is illustrated as being in the form of a disk but the patentee states that it may be made in the form of a cylinder.

As might have been expected it was Aylsworth, the colleague of Edison and the inventor of Condensite, who did most of the pioneering in perpetuating sound waves on records made of arti-

ficial plastics. His first results were disclosed to the world in the form of Patent No. 1,036,416 dated August 20, 1912, (Filed April 1, 1909). The disk record had not yet entirely supplanted the cylindrical type and Aylsworth's first few patents refer to cylindrical records. Patent No. 1,036,416 discloses a method of overcoming the difficulty of removing such records from the mold. This is accomplished by producing a partial vacuum within the bore of the cylinder while the latter is in a somewhat plastic condition in the mold, admitting the flow of air within the annular space between the bore of the mold and the periphery of the cylinder caused by the production of said vacuum within the bore of the cylinder for a sufficient time to entirely detach the cylinder from the mold and then removing the cylinder from the mold by direct longitudinal movement.

#### Phenol Resin Records

In Patent 1,043,389 dated November 5, 1912, Aylsworth discloses a composition and a method of making a cylindrical record.

An excess of paraformaldehyde, or di- or tri-oxymethylene is added to a phenol resin containing polymerized formaldehyde and a substance such as benzoic anhydride which is both a final product solvent or plasticizer and a water combining element. The excess of polymerized formaldehyde causes the mass to foam during the transition from the molten plastic to the hard solid condition. The mass is poured into a rotating mold, the surface next to the mold being formed in a thin non-porous layer and the rest of the record being formed porous. The thickness of the non-porous layer may be controlled by first pouring a non-foaming composition into the mold.

In Patent 1,075,807 dated October 14, 1913, and Patents 1,146,384; 1,146,385 and 1,146,386 Aylesworth describes sev-

eral modifications of the methods disclosed in his other patents. In all of these patents the composition or the active reagents are poured into a smooth bore metal tube and the tube is rapidly rotated in an oven heated by steam or dry heat. Several tubes may be rotated in one apparatus. A gas such as air or formaldehyde may be forced into the mold before it is sealed to augment the pressure developed by the centrifugal action of the molding process. A variation consists in using an uncovered mold contained in a pressure chamber, in order to increase the speed of reaction without the necessity of speeding up the apparatus.

In the last mentioned patent, namely, 1,146,386, the resinoid tube is removed from the apparatus and placed within a cylindrical mold; a core in the form of a rubber container is placed within the record blank; the mold and its contents are placed in a heated oven and a pressure medium such as castor oil is introduced into the rubber container. The pressure liquid is introduced from the center of the core so that the blank is caused to first intimately contact the mold surface at a point intermediate its ends and then progressively toward its ends resulting in the formation of bearing flanges.

#### Cylinder Records

All of these patents are of more than historical interest since they disclose feasible methods of molding cylinders that can be used for other purposes than recording sound waves. The patents that are of immediate importance in the acoustical art are those that disclose compositions and methods of making sound records of the disk type. All of the patents disclosing this type of record made of a resinoid will be briefly abstracted. Before doing so, it may be noted that there does not appear to be any great likelihood that the artificial plastics will entirely supplant shellac as a record

making material. In fact in spite of the great amount of missionary work the resinoids have made little impress upon this art. The reasons are not far to seek.

#### Shellac

Shellac, though not as universal in its applications as the resinoids, has properties that have given it a ranking position for use in hot molding processes. The great advantage of this material is that cooling the mold with cold water hardens the article and allows it to be removed almost immediately from the mold so that the mold can be made available for another charge. An additional feature is the small portion of shellac binder (15% to 20%) necessary for the mineral filler. This is due to its property of flowing readily in the mold and completely coating and permeating the filler. Then again shellac has a characteristic hardness and toughness unequalled by any naturally occurring gum or resin. These features together with the natural prejudices of the record making industry against new materials and the scrapping and change in molding equipment that would be necessary to change over from shellac to the artificial plastics assure shellac a commanding position in the industry for a long time to come. And this in spite of the fact that shellac records are very fragile and easily affected by water and heat.

#### Patent Abstracts Disclosing Disk Records Made Wholly or Partly of Artificial Plastics.

1. B. B. Goldsmith, 840,932, Jan. 8, 1907, Filed Dec. 13, 1906.

This appears to be the first United States patent suggesting the use of an artificial plastic composition for sound records. Several modifications of a casein composition are given.

1. Casein, slightly moistened is subjected to heat and pressure under the matrix containing the sound grooves.
2. Casein is treated with

solutions of borax or alkalies and worked up until it will take the groove from the matrix.

3. Casein, or any derivative thereof, is brought into intimate contact as on mixing rolls with a plasticizer or betanaphthol, benzoic acid, carbolic acid, hydrochinon, cresol, pyrocatechin, resorcin, salicylic acid or urea or mixtures thereof, either in the form of solids, liquids or solutions, with or without pigments and fillers such as waste celluloid, finely divided horn, rubber, resins, gums, baryta, infusorial earth, powdered glass, silicates or metal oxides such as iron oxide, corundum or carbondum. Shellac or glycerine may also be added.

The record blank may be formed in one operation with the molding of the sound grooves or in a separate step.

#### Aylsworth's Work

2. J. W. Aylsworth, 1,046,137, Dec. 3, 1912, Filed January 27, 1911, Reissued as 13,051 dated February 11, 1913.

The record is made of a composition consisting of a phenol resin incorporated with a solid solvent or plasticity agent such as a higher halogen substitution derivative of the phenols. Preferably the chloro substitution products of phenols particularly those of ordinary phenol are used though those of the cresols or naphthols may be used. Specific examples include mono-, di-, tri- and pentachlorophenols and tetrachloro-cresol. The plasticity agent may be added to the reacting ingredients in which case it combines with the ammonia used as condensing agent. A variation consists in first forming an ammonia chloro-phenol and adding it to the other ingredients.

3. J. W. Aylsworth, Patent 1,060,577, May 6, 1913, Filed Sept. 17, 1929.

This patent discloses a method of duplicating a record. The method consists in forming a temporary matrix of copper or zinc about a master record, removing the master record, form-

ing a master within the temporary matrix, removing the temporary matrix, forming a permanent matrix of phenolic condensation product about the metallic master, removing the metallic master, forming metallic duplicate records within the matrix and removing them.

4. J. W. Aylsworth and E. L. Aiken, Patent 1,061,258, May 13, 1913, Filed November 17, 1910.

This patent discloses a method for making a record mold. The method consists in placing a backing plate having a central hole upon the back of a disk mold with a soldering material such as tin or an alloy of tin and lead therebetween, placing a centering pin in the central hole through the mold and the backing, laying the mold face downward upon a plate of material which will not injure the mold surface or adhere to the same under the necessary heat and pressure, placing between the mold and plate and around the centering pin a granulated mixture of a fusible phenolic condensation product or a phenol resin and a hardening agent such as hexamethylenetetramine, placing a cast iron plate upon the assembly and applying heat and pressure to solder the backing plate to the mold and fuse the granulated material to seal the opening around the pin. The plate upon which the mold is laid may be a disk of thick blotting paper or a final infusible condensation product containing a plasticity agent or solid solvent such as mono-nitro or mono-chloro-naphthalene. A variation consists in forming the plate of a mixture of phenol resin and a hardening agent such as formaldehyde or hexamethylenetetramine.

5. J. W. Aylsworth, Patent 1,071,685, Sept. 2, 1913, Filed April 29, 1909.

This patent discloses a method of duplicating a record. The method consists in forming a temporary matrix of copper or zinc about a master record, removing the master record, form-

ing a master within the temporary matrix, removing the temporary matrix, forming a permanent matrix of phenolic condensation product about the metallic master, removing the metallic master, forming metallic duplicate records within the matrix and removing them.

6. L. H. Baekland, Patent 1,083,264, Dec. 30, 1913, Filed June 11, 1910.

Sound record may be molded from partial condensation products with or without fillers such as baryta, china clay, pigments, fibrous materials or ground wood, which may be incorporated at any stage before the change to the final infusible form takes place. One variation consists in coating cardboard, wood or metal with partial condensation product in solid or liquid form in acetone or alcohol solution. Another variation consists in applying pulverized condensation product to surface already coated with the product. Still another variation consists in impregnating cardboard base and then molding it. Still another variation consists in molding a record from a dry or wet paper mass into which condensation product had been incorporated by heating. The record side or both sides of the disk may have a coating richer in condensation product or may be entirely of condensation product.

Any of the partial condensation products of phenol and formaldehyde which engender the final infusible form may be used, as the phenol alcohols, their partial anhydrides or derivatives or the product of boiling formaldehyde and phenol in the presence of ammonia.

7. J. W. Aylsworth, Patent 1,094,828, April 28, 1914, Filed August 26, 1910.

A sound record is made by compressing a disk with heat against a mold which had been coated with a condensation product and hardened to infusibility. The heat and pressure of the blank against mold transfers the coating from the mold to the blank. Substances such as chloro-toluene, chloride of aniline, stearic anhydride or chlor-naphthalene may be in-

(Continued on page 155)

# Blood Plastics Revival in Modern Form

## Producing Colored Products by use of insoluble color lakes

AS frequently pointed out in our pages, the plastic properties of blood albumen, and dried blood in general, have long been recognized. The art of molding blood plastics dates back about fifty years. However, there has apparently been a recent rerudescence of this art, and quite a number of recent articles and patents testify to the attention given to this field of plastics.

The American Nuplax Corporation of New York, has acquired the patent of Felix Homberg and Max Landecker, of Barmen, Germany, for the fabrication of colored blood plastics. The patent, U. S. P. 1,724,088; Aug. 13, 1929, describes the process as follows:

### Basic Dyes

The expression lake is the translation of the German term "Farblack." By this term is meant a colored powder which is generally produced by precipitating an organic coloring matter from its solution, onto an inorganic powder, called the substratum, such for example, as lithopone, zinc white, chalk, green earth (glauconite, and also celadonite).

The dyes suitable for this purpose are of the class known as basic dyes, such as malachite green, methyl violet, etc. chrome dyes such as anthracene. An example will perhaps best explain the application of the invention to practice.

Water soluble dry blood may be mixed for example, with 30 per cent by weight of a lake, which may be prepared from lithopone and ethyl green, in the respective proportions of 2000 to 10 by weight, and there is added about 15 per cent by weight of water, to facilitate molding. After mixing, the mass is pressed at 200 atmospheres, at a temperature of 85-

105° C., for from 1½ to 2½ minutes, when there is obtained a dark brown mass, in which a color expert would probably detect a slight olive tone. If this plastic mass is now placed, for example, in a 15 per cent formaldehyde solution the greenish blue color of the lake used, appears after a few hours, while the original brown tone practically disappears.

### Change in Color

A further notable phenomenon is, that in weaker formaldehyde solutions, as for example, 8 per cent, a change of color takes place so that the greenish blue of the lake used becomes very prominent, but still is somewhat merged into the brownish tone of the coloring material of the blood.

By using solutions of formaldehyde of various concentrations, it is thus possible to obtain all color tones between that of the particular lake used and the natural color of the pressed and molded mass. The coloration penetrates to the interior of the mass under the action of the formalin, so that the object is colored as far as the formalin penetrates.

An addition of lesser quantities of a lake for example only 15 per cent by weight, to the water soluble dry blood, produces, with the stronger formalin concentration, instead of the pure color lake, mixtures thereof with the natural brown of the blood.

In every case, however, depending on the quantity of lake added, a color tone is always produced by formalin which differs from that of the pressed plastic mass, and assists the color tone of the added lake in breaking through and modifying the natural brown color.

According to the new process the procedure may be such that

instead of the finished lake (such as lithopone and ethyl green as mentioned above) the substratum, lithopone, and the dissolved dye, for example ethyl green dissolved in the 15 per cent of water, may be added separately, as suggested in the second example below.

### Example 1.

70 kgs. of water soluble dry blood were intimately mixed with 30 kgs. of lake consisting of lithopone and ethyl green (10 g. ethyl green deposited on 2000 g. lithopone), for a period of 5 hours, in a usual mixing drum. Then 15 per cent by weight, of water was added and the entire mixture was mixed for another 4 hours in the mixing drum.

The resulting powder was then filled into molds and pressed in hydraulic presses under 200 atmospheres pressure and at a temperature of 105° C. for 1½ minutes.

The molded article was then placed in a 20 per cent solution of formaldehyde for 6 hours. At the end of the 6 hours, the object showed a green color on the surface, and after a further treatment in the solution, of 42 hours, it became green throughout.

### Example 2.

70 kgs. of water soluble dry blood were intimately mixed with 30 kgs. of lithopone for 5 hours in a usual mixing drum. After this time 5 per cent by weight of the above mixture of water, mixed with 30 gms. of methyl violet were added and the entire mixture was mixed for another 4 hours in the mixing drum.

The resulting powder was then filled into molds and pressed in hydraulic presses under 200 atmospheres pressure at a temperature of 105° C. for 1½ minutes.

# Using Hair As a Plastic Material

**Under the action of heat and pressure ordinary hair becomes consolidated into a material resembling hard rubber**

**S**OME time ago we called attention to the fact that natural silk was thermoplastic and could be molded under heat and pressure.

(See PLASTICS 1928 Vol 4 p. 254).

In our quest of the unusual and not so well known in the plastics field, we have found that ordinary hair can be molded under heat and pressure in just about the same way as silk. In fact this was actually patented over forty years ago, although we have no definite information as to whether the invention ever went into any widespread or practical use. As a curiosity in plastics, we believe some of the details described by the inventor may be of interest.

Thus Orazio Lugo, of New York in his United States Patent 343,590, of June 15, 1886, says that the object of his invention is to produce from a material never before used for the purpose, ready at hand, and of abundant source, a vulcanite or a substance resembling vulcanite, pyroxylin, or the like, possessed of all the requisite properties and qualities of common vulcanite.

## Similar to Pyroxylin

The invention consists in subjecting clean hair to the simultaneous action of heat and pressure, whereby a solid substance, resembling and possessed of the properties and qualities of common vulcanite, pyroxylin, or the like may be produced of any desirable form, shape, or kind.

To carry the invention into effect he takes hair of any kind and frees it from extraneous matter, particularly from oily or fatty substance, in any suit-

able and convenient manner, and places it in suitable quantities in an appropriate and sufficiently strong vessel and subjects it to considerable pressure, preferably under a hydraulic press, at the same time heating it to about 200° Fahrenheit, adding more of material, as requisite, and again subjecting to pressure and heat until a more or less compact mass is formed. This will occupy but a few minutes. The temperature is then raised to about 300° Fahrenheit, the vessel being kept under sufficient pressure to keep it firmly closed, or direct pressure being brought to bear upon the material, and the heat being continued for the space of from one to three hours, according to the degree of hardness which it is desired to impart to the material; the longer the material being kept under treatment the harder it will become.

Steam-heat may be employed, and suitable pressure as well as

heat may be supplied by steam under requisite tension. This produces a solid and compact product, which resembles the common vulcanites produced from india-rubber and sulphur, and without the addition of any other materials, the product being of any desired degree of hardness and elasticity, according to the length of time and the degree of heat and pressure employed in the process.

The product can be worked in any manner, turned or polished, as horn, hard rubber, or common vulcanite or pyroxylin are treated, and can be applied to all the uses in the arts in which they are employed.

It is obvious that the admixture of other substances or coloring-matter or any suitable ingredient or ingredients with the hair would fall within my invention.

If any of our readers can recall having seen any of this product, will they kindly communicate the fact?

## A Low-Priced Plastic From Pulp or Asbestos

**U**SING only readily obtainable and quite inexpensive material, it is possible to produce acceptable molded products of a type suitable for the manufacture of chair and toilet seats, doors, boxes and similar objects.

Though much has been done in the field of molding impregnated pulp articles, it seems still to be possible to get claims of pretty fair scope allowed in an American patent.

As evidence of this, we cite from recently issued patents

granted to Meryl M. Frost, of Capac, Mich. (U. S. P. 1,735,426-7-8 and 9;) November 12, 1929.

The first three patents are almost alike. They cover a process of first forming a fluent pulp of fibrous material, such as ground wood pulp or pulp of rag fiber, waste-paper, hemp, jute or even asbestos. To this pulp having preferably from four to twenty per cent solids is added rosin soap up to fifty per cent of the total solids. This mixture is agitated thoroughly and

(Continued on page 160)

# Utilization of Pyroxylin Plastic Waste

Camphor often profitably recovered; preparation of lacquers and cements; re-use in plastic products

By Dr. A. Bresser

AS in practically every other line of manufacture, the fabrication of pyroxylin plastic articles leads to the production of scrap and waste. This can to a certain extent be re-used in the products, but by reason of the ready decomposition of pyroxylin itself, and its loss of stability when under the influence of repeated heating and of certain chemical, this re-use is quite limited in scope.

A comparatively small amount of the pyroxylin plastic scrap is used up in the form of cements and lacquers, by being dissolved in suitable solvents. There are also known a number of processes aimed at the recovery of the camphor or artificial camphor contained in the pyroxylin plastic scrap, mainly by using superheated or ordinary steam distillation. However, the amount of camphor thus actually recoverable is only a fraction of that contained in the material originally.

## Camphor Recovery

According to a patented method (German Patent 398251, Class 39-b) the camphor can be almost completely recovered if the pyroxylin plastic scrap, prior to the steam treatment is very finely comminuted. This can be accomplished in various types of grinding mills (wet) such as hollanders, attrition mills. This makes it possible also to utilize the very fine small scrap, which hitherto, because of the dust and dirt with which it was contaminated failed to be used for any purpose. In one main respect this method has the advantage of being very cheap.

A very difficult chapter in the utilization of pyroxylin plastic scrap is the removal of coloring

*In many of the pyroxylin plastic industries, considerable amounts of scrap and waste is unavoidably produced by reason of the shape of the articles, which are made either from sheet or rod. Some of this occurs as shavings, others as sheet stock of various dimensions. The different colors present quite a problem, and the commercial sellers of pyroxylin plastic scrap maintain a considerable force of sorters to separate the white, colorless, red and other colored stock. This adds considerable to the expense, and, to say the least, is a very hazardous undertaking, as large quantities of the highly inflammable material must of needs be stored, and in its comparatively divided condition present even a greater danger than the original stock from which the waste comes.*

*The present article concerns itself with the practical utilization of the pyroxylin plastic scrap, and is taken from our German contemporary, KUNSTSTOFFE, 1929, 19, p 205.*

matter and dyes. It has been the practice in the past, to separate the colored material and to sort it according to its dominant color, but this is expensive. Decolorization of dyed scrap by means of decolorizing carbon, which was used to treat solutions of the scrap, proved to be a failure, as not only was the decolorizing power of the carbon much too low, but small particles of the carbon would remain even in the filtered solutions, destroying their value.

Better results along this line

have been attained by the use of substance having powerful surface-action, such as various kinds of siliceous materials, particularly activated silica-gel, silicates etc. (as for instance described in German Patent 453,458). These silicic acid preparation possess the power of removing the crystalline constituents of a colloidal solution of cellulose derivatives.

When for example a 5% solution of waste pyroxylin plastic film (film-scrap) is filtered through a layer of fuller's earth, a perfectly clear solution, suitable for incorporation into lacquer, can be obtained. An alternative method is to mix the fuller's earth with the solution, which is agitated for a little while, and is then allowed to stand to let the fuller's earth and the impurities collected thereby, to settle. Similar results were obtained when treating solutions of the cellulose esters, such as cellulose acetate, or of the cellulose ethers, as ethyl cellulose; only in the last two cases it was found advisable to boil the solutions, preferably under reflux (to save solvent).

## Re-working Into Plastics

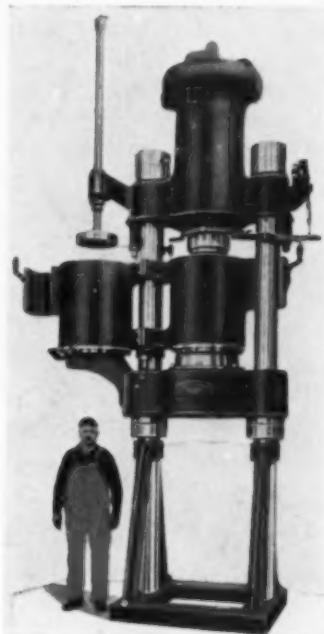
A Swiss process, recently patented (Swiss Patent 115,322) contemplates the utilization of pyroxylin plastic scrap by treatment directly, without any solvents, with water, fillers and large amounts of plasticizing (gelatinizing) agents, the resultant mixture being worked up into fresh plastics. For example, according to this method, 600 grams of cellulose acetate (Cellone) scrap, which contained about 400 grams of actual cellulose

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acetate plus 200 grams of gelatinizer, were mixed with 1200 grams of barium sulfate (ground heavy-spar) and 250 grams of water. This mixture was kneaded in a mixing machine for some time until fairly homogeneous, whereupon there were added 50 grams of a further gelatinizing agent, namely triacetin, and the mixture again kneaded for about one hour. The mixture was then heated in the mixed until all of the added water had been driven off as vapor. The resultant mass is plastic, and can be molded at about 120° C., forming articles that come from the press in their final finished molded form.

#### Lowering Melting Point

Another Swiss process (Swiss Patent 129,010) the pyroxylin plastics have their melting point lowered in the following manner; thus avoiding the use of solutions. According to the grade of the expected mixture, the scrap is first comminuted, and mixed with a non-volatile solvent, such as triphenyl phosphate, diethyl phthalate, acetanilid, ethyl-acetanilid, ethylated para-toluenesulfonamide or the like plasticizers. Only a comparatively small amount of these plasticizers need be used; for instance 2 grams of acetanilid suffice for 100 grams of the scrap. The product that results from this admixture can be molded when sufficiently warmed. As the melting point, (softening point) of the scrap is thus lowered, temperatures can be employed for molding that are so low that danger from fire is practically obviated.

An American process (U. S. P. 1,497,138) proceeds by subjecting the scrap to a solution that is at least capable of causing the scrap to swell, whereupon it is decolorized. One way of carrying this out, is to treat the scrap with a mixture of 30% of acetone with 70% of water, at ordinary temperature. After the scrap has been sufficiently swollen, it is mixed physically with decolorizing carbon. Other solvents that act similarly to

the acetone are a solution of 15% of methyl alcohol in water; or butyl alcohol can be employed.

A further American process (U. S. P. 1,547,187) makes use of organic peroxide, such as benzoyl peroxide, phthalyl peroxide, fumaryl peroxide, phthalic acid peroxide and the like as decolorizing agents for treating pyroxylin plastic scrap. The required peroxide can be prepared by the action of sodium peroxide on the acid-chlorides of the above mentioned substances. The bleaching action of these organic peroxide has been known for some time, but their application to the decolorizing of pyroxylin scrap is new as it is coupled with the advantage that no damage is done to the pyroxylin therein contained.

A specific example of the method of carrying out this process is as follows:—

The scrap has ethyl acetate mixed with it, whereupon a 60% solution of phthalyl peroxide is added, the mixture being allowed to stand until the ethyl acetate and the peroxide have completely permeated the scrap, whereby the scrap will be effectively bleached. Slight warming, or the addition of a little alkali, hastens the procedure. When carried out in the cold, the process required about 24 hours. When heating the products, as little as fifteen minutes may suffice to bring about the desired bleaching.

The materials resulting from this operation are at once capable of being usefully employed. The amount of peroxide required depends very much upon the degree of coloration of the scrap and the nature of the coloring matter itself. Of course none of these bleaching processes are of any avail in the removal of insoluble mineral pigments, but only applicable to pyroxylin transparent scrap that has been dyed or similarly colored.

The French have also contributed to this problem, as there is described in French Patent 622074 a process of using acetyl-ethyl cellulose. It has

been found possible to effect a separation of the acetyl-ethyl cellulose from its plasticizers, in the cold, by means of solvents, without dissolving the acetyl-ethyl cellulose itself. Suitable solvents for this purpose are: benzine (petroleum ether), trichloroethylene, chloroform, and denatured alcohol, although there are several other solvents that will act similarly. All such solvents as exert only a slightly swelling effect on the acetyl-ethylcellulose can be used.

#### Removing Pyridine

Finally, according to another United States Patent (U. S. P. 1,564,765) it is possible to remove pyridine from pyroxylin plastics. Pyridine is employed in plastics to reduce the viscosity of the pyroxylin. As this substance has a very disagreeable odor, its removal is necessary. It can be removed from the pyroxylin by treating the same with chlorine, or substance that yield chlorine, the former being the best and simplest in use. The scrap is first treated with a swelling agent, and then with chlorine gas. For example the scrap is treated with a 20% solution of acetone in water, or with methyl alcohol or with methyl acetate.

Slight heating makes the process more efficient. After the scrap has imbibed sufficient of this softening and swelling agent, chlorine gas is passed over it or through a mixture of the same with the above-mentioned solution. After a short time the pyridine will have been completely destroyed. At room temperature, and depending somewhat upon the amount of pyridine in the mixture, 30 minutes will suffice to bring about this result. After chlorination, the scrap is thoroughly washed and treated with a substance that will effectively destroy the chlorine. A solution of sodium thiosulfate (photographer's "hypo") will serve, a 5 to 10% solution of this salt being recommended. A final washing to remove the thiosulfate and the resultant salts is also given.

# The World's Recent Progress in Synthetic Resins

A complete and condensed account of patents from the most important industrial countries

By Dr. Aladin

*The patents that are listed here are all of recent origin and disclose the progress realized throughout the civilized world in this field. The dates, except in case of U. S. patents, are those of application. There will be a total of over 450 patents in this review. Publication began in April, 1929.*

(Continued from February Issue)

## C. From Furfural

(Continued from February issue)

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
268	Swiss P. 123,515	P. Haller and H. Kappeler	Artificial mass.	To a mixture of 93 parts of aniline and 50 to 100 parts of water there is added 150 parts of 25% hydrochloric acid, whereafter 135 parts of 40% formaldehyde are added and the resultant mixture is maintained at from 40 to 60° C, being then poured into molds and slightly heated. A red brittle resin results.
269	Swiss P. 125,369	P. Haller and H. Kappeler	Artificial masses. (additions to 123,515).	According to this addition-patent one can use meta-toluidine or a salt of the latter, condensing the same first in an acid medium with formaldehyde, followed by further condensation in an alkaline-reacting solution, until the resin is formed.
270	Swiss P. 125,370			
271	Swiss P. 125,485	Society of Chemical Industry	Method of preparing formed objects from amine-formaldehyde condensation products.	Formed pieces having a specific gravity greater than 1.0 can be obtained by condensing 1 molecule of aniline hydrochloride with 1.8 mol of formaldehyde in aqueous solution. The resin is precipitated by adding sodium hydroxide solution. The precipitated resin is pressed at pressures as high as 100 atmospheres and above.
272	Swiss P. 125,729	Society of Chemical Industry	Method of preparing molded products.	Two mols of formaldehyde are condensed with 1 mol of formaldehyde and 1 mol of hydrochloric acid in aqueous solution, being, if desired, later precipitated by means of alkalies. The powdered resin is pressed while hot in suitable molds.

## XII. Resins From Urea and Formaldehyde

### 1. Preparation

273	U. S. P. 1,458,543	F. Pollak	Preparation of hard insoluble condensation products.
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Urea, thiourea or its derivatives are condensed with 3 mols of formaldehyde or its polymers in presence of bases such as ammonia, hexamethylenetetramine, pyridine or even urea. The preliminary condensation product is a colorless watersoluble fluid, which on further heating is transformed into an insoluble rubbery mass, and finally into an insoluble hard and infusible transparent end product.

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
274	U. S. P. 1,625,283	K. Ripper (assigned to F. Pollak)	Condensation products from urea or its derivatives and formaldehyde.	The gelatinizing and hardening of the water-soluble intermediate products is accelerated by the addition of salts of weak acids, such as sodium acetate, or by addition of ammonium salts, ammonium thiocyanate, ammonium chloride or sulfate.
275	U. S. P. 1,633,337	F. Lauter (assigned to Rohm & Haas)	Preparation of urea-formaldehyde condensation products.	Water-insoluble and clear condensation products are obtained by adding, in presence of a catalyst, a hot solution of urea to a boiling solution of formaldehyde. After condensation the solvent is distilled off. A mass that can be hardened by heat and pressure is said to result.
276	U. S. P. 1,645,848	H. Barthelemy (Societe Industrielle des Matieres Plastiques)	Preparation of condensation products from urea and formaldehyde.	Cf. French P. 603,625 (No. 331).
277	U. S. P. 1,654,215	A. Gams and G. Widmer (Society for Chemical Industry)	Preparation of condensation products from urea or its derivatives, and acrolein.	See Brit. P. 260,288 (No. 307) and F. P. 623,087 (No. 340).
278	U. S. P. 1,658,359	Dr. H. Traun & Sons, formerly Harburger GummiKamm Co. (assignees of F. Steppes)	Preparation of urea formaldehyde condensation products.	See Brit. P. 271,264 (No. 315) and F. P. 618,991 (No. 338).
279	U. S. P. 1,658,597	P. W. Griffith (assignor to American Cyanamid Co.)	Preparation of resinous condensation products from urea, formaldehyde and guanidines.	90 parts of urea and 10 parts of guanidine carbonate are dissolved in 40% formaldehyde solution and boiled under a reflux condenser. The product is then neutralized with hydrochloric acid and two-thirds of the water is distilled off. The resulting concentrated solution is then further boiled down first at 60° C., and then at 80° C. until it is dry, forming a hard, colorless, transparent resin.
280	U. S. P. 1,671,596	F. Lauter (To Rohm & Haas)	Preparation of an artificial resin.	A hot urea solution is gradually added to a boiling formaldehyde solution.
281	U. S. P. 1,672,848	F. Lauter (To Rohm & Haas)	Preparation of resinous condensation products.	An aromatic sulfonamide such as para-toluene-sulfonamide is employed as a condensing agent, if desired in the presence of acids. Fillers may also be added.
282	U. S. P. 1,674,199	A. Gams and G. Widmer (To Society for Chemical Industry)	Preparation of urea formaldehyde condensation products.	The condensation is brought about under increased pressure and at higher temperatures than usual, either in the absence or presence of basic, acid or neutral condensing agents. In place of urea a substituted urea or a thiourea may be used. The formaldehyde may be replaced by any of its polymers. According to the method followed there are obtained either water-soluble or insoluble products, which may be used either as lacquers or for impregnating; or may be hardened.
283	U. S. P. 1,676,543	A. Gams and G. Widmer (To Society for Chemical Industry)	Preparation of urea formaldehyde condensation products.	See Swiss P. 118,725 No. 366).

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
284	U. S. P. 1,678,024	Ch. O. Terwilliger (assigned to F. von Briesen)	Preparation of condensa- tion products.	Formaldehyde is condensed with urea or with thiourea, guanidine etc. in the presence of a phenol such as cresol, xylol, naphthol or tar-oil. Sufficient alkali is added to leave the reaction mixture slightly acid, where- upon it is evaporated.
285	U. S. P. 1,679,246	A. Gams and G. Widmer (to Society for Chemical Industry)	Obtaining soluble prod- ucts from insoluble urea- formaldehyde products.	The insoluble final condensation products are treated with an excess of formaldehyde solution at a temper- ature in excess of 110° C under pressure. The formaldehyde excess is then either distilled off or sufficient urea is added to condense with the same. Thus it becomes possible to re- use the shavings and chippings of the insoluble and infusible condensation products of this type.
286	Can. P. 254,674	F. Pollak (assigned by K. Ripper)	Preparation of urea or urea derivative condensation products with formal- dehyde.	The formation of the soluble initial condensation product is brought about in two distinct phases: the con- densation is first effected in the ab- sence of all acids, i. e. with neutral paraformaldehyde or a neutralized formaldehyde solution; then the con- densation is continued in a second acid-reacting stage, preferably with acid-reacting catalysts. The boiling is continued under reflux, and after a while the solvents (water) is driven off and the material poured into molds, wherein it hardens forming crystall-clear masses.
287	Can. P. 265,519	Damard Lacquer Co. Ltd.	Preparation of synthetic resins.	Resinous condensation products are obtained from urea or one of its sub- stituted products and an aldehyde (formaldehyde) in presence of a large excess of phenol or one of its homo- logs, using ammonia as an acceler- ator. The mixture is heated to the boiling point and the product is dehy- drated in a vacuum. Soluble resins suitable for lacquer are obtained.
288	Ger. Pat. 437,533 Fr. XV. 1157	F. Pollak	Preparation of condensa- tion products.	The free formaldehyde still present in the soluble condensation products is rendered harmless by the addition of such substances as may combine with it, namely urea itself.
289	Ger. Pat. 437,646 Fr. XV. 1168	W. Geisel (I. G. Farben- industrie A.-G.)	Preparation of urea-for- maldehyde condensation products, addition to Ger. Pat. 416,252.	Ultraviolet light is employed not only during the formation of the resin, but also during its hardening.

*This series of condensed accounts of the recent progress of the entire world in the field of synthetic resins will be continued next month. There are now almost 500 patents in this review, all of them issued within the past four years.*

## Condensing Phenol with Cellulose

WHILE combinations of cellulose with the phenols have been described in the past, most of them were but of academic interest. Commercial applications of the synthetic resins are rapidly growing, and since the basic fundamental patents in the phenolic resin field expired a few years ago, the art has been fairly flooded with all

kinds of proposals for the preparation of various kinds of resins and their plastics.

When the development, however, is in the hands of men whose research work in the past has been very successful in this line, anything new that they describe is usually quite interesting.

Among the processes made public during the past six months is one describing the combinations of cellulose in the form of wood flour with phenol directly. No catalysts are used, the temperature employed being alone sufficient to bring about the desired condensation. The process is the combined result of the work of Emil E. Novotny and Charles J. Romieux (U. S. P. 1,721,315; July

16, 1929), and is controlled by the assignor, Mr. John S. Stokes of Stokes & Smith of Philadelphia. The application covering the invention was filed September 6, 1924.

So that our invention may be better understood, the following procedure is shown by example:

#### Wood Flour and Phenol

A mixture of 100 pounds of wood flour and 400 pounds of commercial crystalline phenol are placed in a pressure resisting container which is heated to a temperature of 480° F. for a period varying from 2 to 20 hours, depending upon the type of product desired. The pressure is then gradually released, allowing any uncombined phenol to escape into a suitable condenser, and any further excess of phenol remaining in the product may be readily removed by applying heat to the container connected to a condenser. When the uncombined phenol has been removed, a hard, brownish black, lustrous, high melting resin is obtained. By heating for the longer period of time under pressure in a kettle the wood flour is entirely digested, whereas if the period of heating is shortened undigested wood flour remains which may serve as a filler, and the resulting product after the removal of excess phenol may be employed directly as a molding compound. This method results in considerable economy as it obviates the necessity of dissolving the resinous product in a suitable volatile solvent and impregnating the fibrous fillers therewith and evaporating therefrom the solvent, all these operations being eliminated and the final molding compound obtained in a single operation.

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## The Cellulose Acetate Plastics

What has already been done in this field promises a splendid future

By Joseph Roszman

**I**N January of this year there began a review of American contributions to the art of making molded plastic products from the cellulose ester plastics. After a general resume of the subject, the author gave a short survey of United States Patents in this field, to save the reader the time and trouble of looking them up in the original not so readily available form.

The present article is a continuation of the survey. (See Feb. p. 75.)

12. Lindsay 1,041,113. Oct. 15, 1912.

The process of making plastic compounds of acetyl cellulose consists in (1) incorporating ethyl para toluol-sulphonamid and triphenyl phosphate with an acetyl cellulose which is soluble in acetone; (2) adding methyl alcohol; (3) allowing the mixture to stand at room temperature in a closed vessel until it has become a gelatinated mass; and (4) working such mass on rolls or in a heated press.

13. Lindsay 1,041,114. Oct. 15, 1912.

A composition consisting of a solution of acetyl cellulose in a mixture of trichlorhydrin and ethyl alcohol.

14. Lindsay 1,041,115. Oct. 15, 1912.

Cellulose acetate is mixed with camphor, triphenyl phosphate and methyl alcohol.

15. Lindsay 1,041,116. Oct. 15, 1912.

Similar to patent 1,041,115 except that ethyl alcohol is used.

16. Lindsay 1,041,117. Oct. 15, 1912.

100 parts of acetyl cellulose of the acetone soluble variety are mixed with from 15 to 25

parts of either terachlorethyl acetanilid or trichlormethyl acetanilid and 15 to 25 parts of either triphenylphosphate or tri-cresylphosphate, and stirred until the mixture is homogeneous. From 40 to 50 parts of methyl alcohol is added. The mass is allowed to soak or macerate at room temperature in a closed vessel until gelatinization of the mass has taken place.

17. Lindsay 1,041,118. Oct. 15, 1912.

Acetyl cellulose is mixed with triphenyl phosphate, tetrachlor-ethyl acetanilid and ethyl alcohol.

18. Lindsay 1,045,990. Dec. 3, 1912.

The process consists in dissolving acetyl cellulose in a solvent and adding urea.

19. Lindsay 1,050,065. Jan. 7, 1913.

A composition containing one hundred parts of acetyl cellulose and from ten to twenty parts of triphenylphosphate in admixture with acetylene tetrachlorid and acetone.

20. Lindsay 1,067,785. July 15, 1913.

The process consists in combining triphenylphosphate and an acetyl cellulose soluble in acetone, by the use of a common solvent, and adding urea.

21. Lindsay 1,076,215. Oct. 21, 1913.

The process of making plastic masses comprises incorporating an acetone-soluble acetyl cellulose with camphor in the presence of a small proportion of methyl alcohol.

22. Lindsay 1,076,216. Oct. 21, 1913.

The process of making acetyl cellulose plastic masses comprises incorporating acetyl cellulose with camphor in the presence of a small proportion of ethyl alcohol and heating.

(Continued on page 158)

## Technical Abstract Section

### A Concise Review of Patents and Literature

**Molding Plastic pulp.** William Apfelbaum, assignor to the Pulpore Can & Box Co., Inc., of New York, N. Y. U. S. P. 1,731,240; Oct. 15, 1929.

The invention relates particularly to the manufacture of boxes or containers from plastic material such as paper pulp or fiber.

In plastic molding apparatus, a separable open ended mold body, a mold bottom and a mold plunger cooperating to form a mold cavity of the desired configuration, means for relatively assembling and separating said mold parts and means independently heating each of said mold parts.

The process of molding moist plastic material which comprises compressing the material with the application of heat to the desired configuration and temporarily partially releasing the pressure during the molding operation.

**Flexible Celluloid Sound Record with table-gripping device.** Herman Germain, New York, N. Y. U. S. P. 1,732,747; Oct. 22, 1929.

This invention relates to sound records and more particularly to phonograph disc records made of a thin flexible material, as distinguished from the present day type of record which is of substantial thickness and rigidity.

An object of the invention is to eliminate the troubles incident to the use of a thin flexible record such as those made of sheet celluloid and which has a tendency to split open at the center hole, particularly when the spindle of the phonograph is slightly larger than the hole of the record, as is sometimes the case.

Another object of the invention is to provide means for providing a grip between the record and the turntable spindle to prevent possible movement of the record on the turn table.

**Resinoid-Cork Composition.** Elmer Anson Daniels, and Harry Stirling Snell, assignors to Western Electric Company, New York, N. Y. U. S. P. 1,732,398; Oct. 22, 1929.

Granulated cork 100 grams is mixed with alcohol 30 c. c. in which 0.3 of a gram of castor oil has been dissolved. As soon as this is properly mixed together so that the liquid is uniformly distributed, 15 grams of synthetic resin powder containing such resin as may be transformed to an infusible, insoluble compound by heat and pressure, are added while the moist cork is being agitated.

It is preferred that the type of synthetic resin employed should be both fusible and soluble, but be capable of being rendered both infusible and insoluble by heat and pressure. A synthetic resinous binder adapted for

use in the molding of a composition cork may be a product of the condensation of a phenolic body with an active methylene compound, into which hexamethylene-tetramine is introduced as a hardening agent.

As soon as a uniform mixture is obtained the cork granules are spread out to dry and when dry may be used for molding.

As a new article of manufacture, a molding composition comprising granulated cork, phenolic resin, hexamethylenetetramine and castor oil.

A method for producing a cork composition which comprises moistening the cork granules with a mixture of castor oil and alcohol and then mixing therewith a synthetic resinous binder.

**Forming Gear Blanks.** Louis T. Frederick, assignor to Fibroc Insulation Company, Valparaiso, Ind. U. S. P. 1,737,455; Nov. 26, 1929.

In the method of forming composite articles, the steps of forming a stack of strips of sheet material with spaced

notches arranged so that the base of the notch is open at the margin of the strip, and arranging the strips accurately and shifting them endwise with respect to each other to thereby close the notches and bring them out of register with each other.

**Higher Aldehyde Derivative of Reaction Products of Aldehydes and Amines.** Clayton Olin North, assignor to the Rubber Service Laboratories Company, of Akron, O. U. S. P. Re-issue 17,511; Dec. 3, 1929.

According to the preferred mode of procedure, acetaldehyde is reacted with aniline to produce a compound in which 3 mols of acetaldehyde are combined with 2 mols of aniline, and the material so obtained is dehydrated by evaporation at temperatures no higher than 105° C., until the moisture content is substantially reduced.

132 parts ( $\frac{1}{4}$  mol) of the dehydrated condensation product of acetaldehyde and aniline above described are refluxed with 79.5 parts (approximately 1.8 mols) of acetaldehyde for

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a period of about 14 or 15 hours at a temperature above the boiling point of the aldehyde, but below the boiling point of water. At the end of the reaction period heat to a temperature of not over 105° C., to evaporate the water and remove the excess aldehyde. When the water has been practically all removed it is often advantageous to heat at a somewhat higher temperature for a period of about  $\frac{1}{2}$  hour or less, but in no case is it advisable to heat above about 115° C. The resinous product so obtained contains approximately 2% of moisture, is hard and vitreous, and can be readily ground and sifted.

**Electrical Insulation for Cables.** William C. Geer, assignor to the B. F. Goodrich Company. U. S. P. 1,731,486; Oct. 15, 1929.

A cable structure comprising an insulating cover consisting of a plurality of layers of plastic material, the inner layer being composed of an admixture of hard, friable heat-plastic derivatives of rubber, tough, non-grindable heat-plastic derivatives of rubber, rubber and gutta percha, said mixture having cold flow properties substantially equal to that of gutta percha, and an outer layer of a similar composition to which the increased proportion of tough, non-grindable heat-plastic derivatives have been added, the composition of said outer layer having a lower cold flow than the inner layer.

**Synthetic Material from Furfural.** Clarence A. Nash, John P. Trickey and Carl S. Miner, assignors to the Quaker Oats Company, of Chicago, Ill. U. S. P. 1,736,047; Nov. 19, 1929.

Ninety-four parts of phenol and approximately one hundred four parts of furfural are brought together in the presence of a catalytic agent which may comprise a quantity of sodium carbonate substantially equal to one percent by weight of the reaction mixture.

When the reaction has proceeded to the proper stage, the reaction is arrested by termination or suitable reduction of the external heat supply.

For production of a plastic compound, approximately 19 parts of the binder constituted as described is maintained at or brought to a temperature preferably somewhat below that at which reaction proceeds, and 50 parts of comminuted asbestos or other suitable filler is added thereto and thoroughly incorporated therein and impregnated thereby.

After such incorporation and impregnation of the binder and filler materials the resultant mix is preferably disintegrated, screened to approximately 10 to 20 or other desired mesh and is then molded.

**Molding Method and Apparatus.** George E. Foerstner, assignor to the B. F. Goodrich Company. U. S. P. 1,740,082; Dec. 17, 1929.

The method of molding plastic material which comprises concurrently forcing stock from a single supply mass by extrusion into a plurality of mold cavities and, while holding the

stock under pressure in the several cavities by pressure applied to the supply mass, shearing off from the supply mass the masses of stock within the respective cavities, the supply mass as a whole being held in substantially the same position with relation to the mold throughout the filling of the mold cavities and throughout the shearing off operation.

Molding apparatus comprising an extrusion chamber formed with an extrusion aperture in a wall thereof, a shear plate mounted against the outer face of said wall and formed with an extrusion aperture, the plate being slidable with relation to said wall to effect registry and non-registry of the two said extrusion apertures with each other, a cavitied mold, and means for holding the mold with its cavity in stock-receiving relation to the extrusion aperture of the plate.

**Manufacturing Frames for Sunglasses.** Frank Spill, assignor to the Spill Manufacturing Co., Inc., East Rutherford, N. J. U. S. P. 1,739,696; Dec. 17, 1929.

The method of making frames for spectacles and the like, which method comprises bending a continuous celluloid rod into a series of loops, pressing the central parts of the loops together to form bridges, retaining the portions of said loops on the respective sides of the bridges in the form of lens frames, and severing said loops to provide separate frames for spectacles.

**Vinyl Ester Resins.** Howard W. Matheson and Frederick W. Skirrow, assignors to Canadian Electro Products Company, Ltd., Montreal, Canada. U. S. P. 1,725,362; Aug. 20, 1929.

#### Example I

One-tenth of one part of acetaldehyde or slightly less is added to 100 parts of vinyl acetate (by volume), and the mixture placed in a bomb where it is heated for approximately sixteen hours at a temperature of approximately 100° C. Unchanged vinyl ester and any unchanged aldehyde that may remain are separated from the product by distillation in any suitable way, and about 66 parts of a product will be obtained which is hard when cold but of a tough, rubbery consistency when warm.

#### Example II

Proceeding as in Example I but using from 1 to 5 parts of acetaldehyde to 100 parts of vinyl acetate, approximately 95 parts of product will be obtained, which is slightly softer than that resulting from the process of Example I.

**Producing Phenolic Condensation Products.** Franz Kurath, assignor to Economy Fuse and Manufacturing Company, of Chicago, Ill. U. S. P. 1,726,671; Sept. 3, 1929.

The process which consists in producing a mixture of formaldehyde, phenol and furfuralide, said formaldehyde being present in sufficient quantity so that an infusible product will result upon heating, and then heat treating said mixture.



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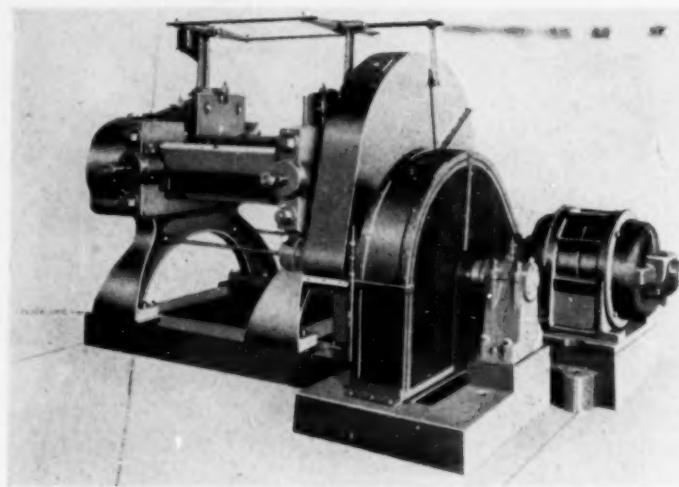
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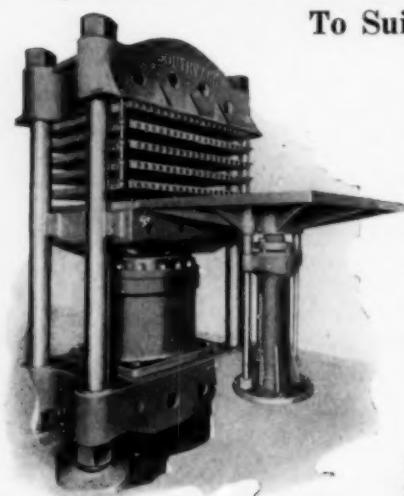
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**Reaction Products of a Natural Resin-Phenolic Resinous Material.** August Amann, assignor to Chemische Fabriken Dr. Kurt Albert, G. M. B. H., of Biebrich-on-the-Rhine-Amenburg, Germany. U. S. P. 1,736,757; Nov. 19, 1929.

The method of producing readily soluble resin compounds of value for use in making varnishes or the like which comprises heating a major portion of a natural resin with a substantially smaller portion of a phenolic condensation product containing a reactive hydroxy-methyl group at temperatures not exceeding 150° C. until the reaction is complete and a readily soluble homogeneous product results.

**Urea and Formaldehyde Condensation Products.** Oscar A. Cherry, assignor to Economy Fuse and Manufacturing Company, of Chicago, Ill. U. S. P. 1,737,918; Dec. 3, 1929.

Formaldehyde solution of 40% strength 400 parts are heated to boiling under a reflux condenser in the presence of 5 parts of a metal, for example zinc or nickel. The boiling is continued for 2 to 3 minutes and the solution is allowed to cool somewhat. Then 100 parts of urea are added and the solution is again heated to boiling under a reflux condenser. When the solution begins to boil the heat may be removed since the reaction which occurs is exothermic and the boiling will continue for some time without further application of heat. When ebullition ceases the solution is filtered to remove the excess metal and the clear, limpid filtrate is distilled until substantially all of the uncombined water is eliminated. The resulting product is a clear, viscous liquid which is poured into molds and is heated at a temperature which is gradually increased from 50° to 100° C. over a period of a few days or a week depending upon the size of the articles cast. The final product is a transparent, strong and very tough article, unaffected by cold water but disintegrated by boiling water. It may be machined.

**Glyptal Type of Resin and Method of Making Same.** John H. Schmidt, assignor to Bakelite Corporation. U. S. P. 1,739,771; Dec. 17, 1929.

A process of obtaining a composition of the glyptal type which comprises dissolving phthalic anhydride in glycerol, filtering the mixture to remove impurities therefrom, heating the mixture to cause a reaction and continuing the heating until a temperature of about 205° C. is reached and a sample at a temperature of about 180 to 190° C. exhibits the property of stringing, then chilling the fused mass by pouring into thin slabs exposed to normal room temperatures until solidification occurs, and baking the cooled product at about 125 to 145° C. for a period of about twelve weeks, when the slabs have a thickness of about an inch, to advance or harden the composition.

A composition of the glyptal type commensurate with that obtained by the process of claim 1.

### Sound Records

(Continued from page 139)

corporated into the condensation product to accelerate the hardening as well as trioxymethylene or hexamethylene-tetramine.

8. J. W. Aylsworth, Patent 1,098,608, June 2, 1914, Filed February 11, 1910.

This patent discloses a composition suitable for making a hard surface for a sound record. The composition may be made by dissolving any of the so-called shellac substitutes of phenolic or cresolic origin in methylated spirits, grain alcohol, wood alcohol or mixtures thereof together with hexamethylenetetramine or the products obtained by reacting upon aqueous ammonia with formaldehyde or polymers thereof. The resinoid and hardening agents may both be anhydrous. The ingredients may be separately dissolved in the solvent and mixed or they may be dissolved together or the solvent may be omitted and the methyleneamine and the plastic mixed while the resin is in fused condition in which case the mixture may be rolled into thin sheets for being dissolved in the solvents or made up into rolls.

A suitable final product solvent or plasticity agent may be incorporated in the composition. Among such solvents are mentioned naphthalene and some of its derivatives especially the mono-nitro, di-nitro, and mono-chloro and tetra-chloro-naphthalenes, dinitro-benzene, preferably the meta variety, acetanilide, ricinoleic acid and recinelaic acid and their anhydrides, benzoic acid and anhydric and diphenylamine.

9. J. W. Aylsworth, 1,102,630, July 7, 1914, Filed May 14, 1909.

A sound record may be made from a composition prepared in one of the following ways:

1. Phenol or homologues such as cresol is heated in autoclave and formaldehyde gas is pump-

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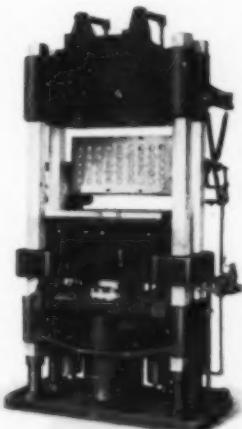
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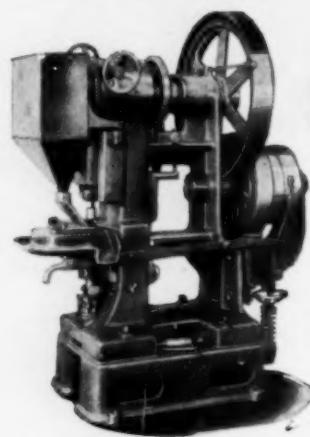
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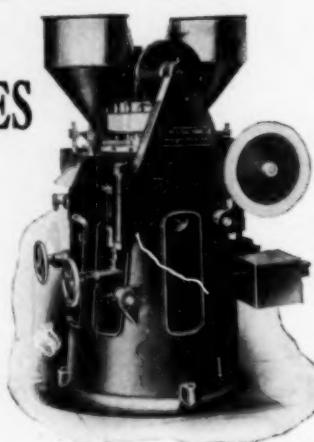
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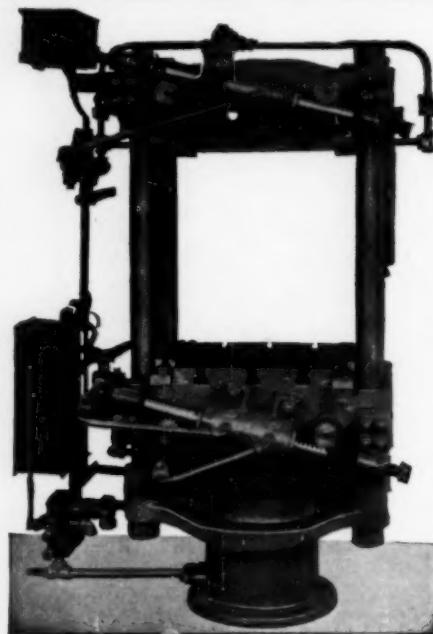
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ed into the bottom of the container while the mass is being stirred. When the reaction is completed, the steam is allowed to escape and the product is dehydrated.

2. Phenol and formaldehyde solution are allowed to react in the presence of a basic or acidic accelerator. The infusible product is crushed, pulverized, baked to drive off water and acid vapor; mixed with phenol or cresol or a mixture of phenol and naphthalene and heated in presence of acidic or basic catalyst under own pressure to form fusible resin. Excess phenol may be caused to react with formaldehyde gas as in first method or to be distilled off. Scrap materials or overcured resinoids may be utilized as the starting materials. A variation consists in purifying the ingredients and omitting the catalysts.

The product of either process is treated with more formaldehyde, preferably in polymerized form; a water combining element such as benzoic or phthalic anhydride is incorporated therewith as well as a final product solvent or plasticity agent such as naphthalene, its nitro or chloro derivatives preferably the mono-nitro and di-nitro-benzene preferably of the meta variety, acetanilide, ricinoleic acid and ricinelaic acid and their anhydrides; benzoic acid and anhydride and diphenylamine-naphthalene. A substance performing both the plasticizing and water combining functions such as benzoic or ricinelaic acid may be used. Acid catalysts such as aniline hydrochloride, hydroxylamine hydrochloride and pinene hydrochloric may be added to hasten the final reaction. The product may be dissolved in alcohol and used with or without fillers or pigments.

10. J. W. Aylsworth, 1,102,631, July 7, 1914, Filed August 6, 1910.

The patentee states that when a sound record is molded of a composition consisting of a phenolic condensation product

and a filler such as wood pulp or fiber, the product is of non-uniform texture and produces foreign sounds and scratchy noises. It is proposed to remedy these defects by employing a comminuted infusible condensation product as the filler. The filler is made from phenol and formalydehyde or fusible condensation product and a methylene containing hardening agent in a volatile solvent in such a way that a porous, easily comminuted mass is produced. The solvent may be alcohol, amyl acetate or amyl alcohol. A plasticity agent or final product solvent such as mono-chloro-naphthol may also be added. The infusible product is comminuted and mixed with a hardening agent such as hexa and fusible condensation product binder either in powdered form or dissolved in a solvent. The powdered or plastic mass may be compressed and heated to infusibility in the mold. A variation is to heat in the mold merely to form the article and to complete the heating after removing the article from the mold.

11. J. W. Aylsworth, 1,102,632, July 7, 1914, Filed July 22, 1911.

A lacquer suitable for forming the record surface of a sound record is disclosed. The lacquer may be made by melting and mixing a dehydrated phenol resin or a shellac substitute with a solid solvent or plasticity agent such as are disclosed in the previous patents and also with a small amount of free phenol or cresol to act as a thinning ingredient. A water-free solvent such as acetylene-tetrachloride, amyl alcohol, refined fusel oil, oil of mirbane, absolute ethyl and methyl alcohol may be then added while the mass is heated and then a hardening agent such as paraformaldehyde, dioxymethylene, trioxymethylene or a mixture thereof or hexa- or other methyleneamine.

*To be continued in the April issue of Plastics*

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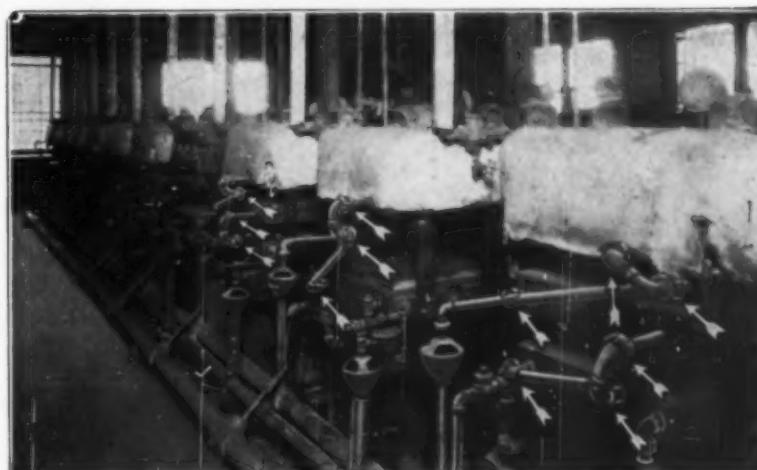
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## Cellulose Acetate Plastics

(Continued from page 150)

23. Koller 1,079,773. Nov. 25, 1913.

1 part of cellulose acetate is mixed with 2 parts of carbolic acid and then treated with 20 parts of perchlorethylene.

24. Danzer 1,089,910. Mar. 10, 1914.

A plastic composition comprising a cellulose acetate and a glycerin derivative in which at least one of the hydroxyl groups of glycerin is replaced by the radical— $OC_6H_5$ .

25. Reid 1,095,999. May 5, 1914.  
Acetyl cellulose containing pentachlorethane.

26. Lindsay 1,128,468. Feb. 16, 1915.

The process of making plastic masses comprises incorporating an acetone soluble acetyl cellulose with triphenylphosphate in the presence of a small proportion of methyl alcohol and heating.

27. Lindsay 1,133,385. Mar. 30, 1915.

A product comprising acetyl cellulose, triphenylphosphate and urea obtained by dissolving the same in a mixture of acetone and acetylene tetrachlorid, and permitting the solution to dry and harden by evaporation.

28. Lindsay 1,136,248. Apr. 20, 1915.

The process of making plastic masses comprises incorporating acetyl cellulose with tetrachloroethyl acetanilid in the presence of a small proportion of methyl alcohol, the proportion of the alcohol being about one to one and one-half times the acetanilid ingredient.

29. Lindsay 1,143,979. June 22, 1915.

A solvent for acetyl cellulose comprising 60 to 70 parts by volume of ethyl acetate and 30 to 40 parts by volume of methyl alcohol.

30. Beatty 1,158,960. Nov. 2, 1915.

A plastic composition essentially cellulose acetate, dioxydiphenyl-dimethyl-methane and alcohol.



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31. Beatty 1,158,963. Nov. 22, 1915.

A moving picture film composed of a mixture of cellulose acetate and a condensation product of acetone and phenol.

32. Bonner 1,173,337. Feb. 29, 1916.

The process of producing plastic articles comprises producing a fluent reaction product of formaldehyde and a phenol, dissolving cellulose acetate therein to produce a fluent composition, shaping the composition while in a heated condition and continuing the heating to harden the mass.

33. Meyer 1,175,791. Mar. 14, 1916.

Cellulose acetate is dissolved in chloroform and precipitated

with water, benzol or ethyl alcohols forming a plastic mass.

34. Dreyfus 1,181,858. May 2, 1916.

80 kilos of cellulose acetate, easily soluble in alcohol-tetrachlorethane, are mixed with about 40 liters of alcohol and 40 kilos of tetrachlorethane and kneaded to a plastic mass.

35. Dreyfus 1,181,859. May 2, 1916.

A celluloid substitute including a cellulose acetate not readily soluble in tetrachlorethane, but readily soluble in alcohol-tetrachlorethane mixture, and a solvent including an etherified phenol.

36. Dreyfus 1,181,860. May 2, 1916.

A celluloid substitute com-

prising a cellulose acetate substantially insoluble in chloroform and in tetrachlorethane, but readily soluble in chloroform-alcohol, and in tetrachlorethane-alcohol, and an aromatic side chain alcohol.

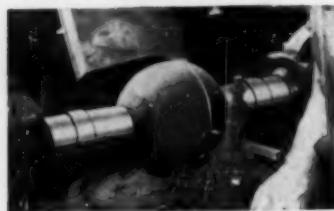
37. Eichengrun 1,185,074. May 30, 1916.

A thermoplastic composition is made by mixing cellulose acetate with acetyl methyl anilid, ethylester of lactic acid, benzene and heating to 70° C. Zinc white is then added producing a plastic mass.

38. Lindsay 1,188,797. June 27, 1916.

The composition comprises acetyl cellulose aqueous methyl alcohol containing about 3½ to 7% of water, benzol, triphenyl

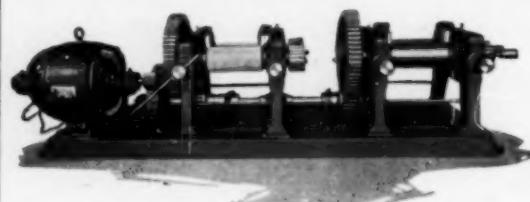
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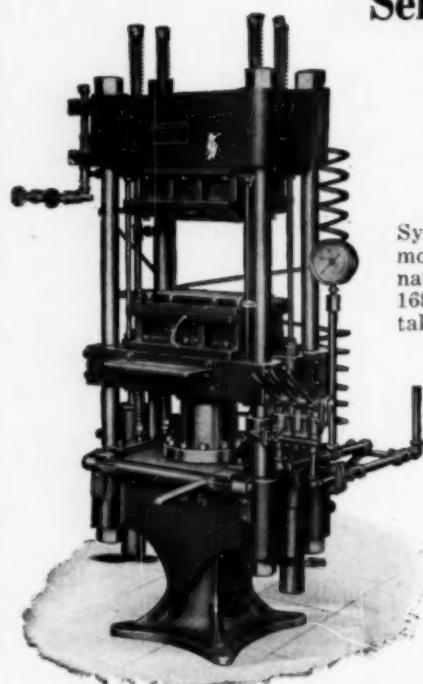
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phosphate and paraethyltoluol-sulfonamid.

39. Lindsay 1,188,798. June 27, 1916.

A mixture of about 100 parts of acetyl cellulose, about 30 to 40 parts of an aryl sulfonamid, about 100 parts of chloroform containing about 10 to 20 parts of a monohydric alcohol having not more than two carbon atoms.

40. Lindsay 1,188,799. June 27, 1916.

The composition comprises acetyl cellulose in about 60-70 parts by volume of methyl acetate and 30-40 parts of methyl alcohol, and further comprising paraethyltoluolsulfonamid and triphenylphosphate.

Eighty four further patents are included. For continuation see April issue.

**Low Priced Plastic**

*(Continued from page 141)*

pumped into suitable dies where the water is expressed therefrom and the article formed under a pressure depending on the article to be produced up to six hundred pounds per square inch. The formed article is then removed from the die and dried and rough finished if necessary.

After the drying steps the article is then dipped in a solution of preferably sixty per cent pine oil and forty percent banana oil and allowed to remain a short time, say from three to ten minutes or longer if necessary to allow the said solution which is quite fluid to impregnate to some extent, after which it is allowed to cool. If it is desired to completely impregnate, the article should remain in the said treatment for a considerable period. The thus treated article is then painted if desired and is ready to be marketed.

The second patent varies this procedure in impregnating the dried molded object with a solution of six parts of sulfur, three parts of rosin and one part of paraffin. Evidently these substances are molten together, al-

though the patent does not say so, but one can infer as much as the articles, after immersion in this mixture for fifteen minutes are withdrawn and allowed to cool.

The third patent varies the procedure by using a solution of 3 parts of shellac and 1 part of borax, preferably under pressure. Presumably the ingredients are dissolved in water.

#### With Casein

According to the last patent the process is carried out by first forming a fluent pulp of fibrous material, such as ground wood pulp or pulp of rag fiber, wastepaper, hemp, jute or even asbestos. The pulp is beat up to a liquid form by adding a solution of casein and borax thinned down with water to the desired consistency. This pulp after heating is put into suitable dies and pressed under the desired pressure preferably 300 to 500 pounds per square inch depending on the article to be formed. This article is then removed from the dies and allowed to dry. After drying the article is then dipped in a bath of formaldehyde which acts chemically upon the casein and makes the article practically water proof.

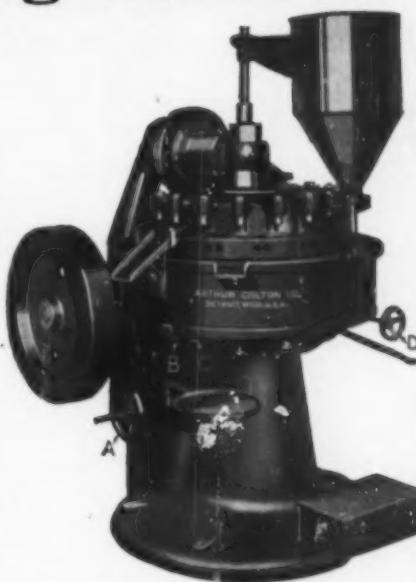
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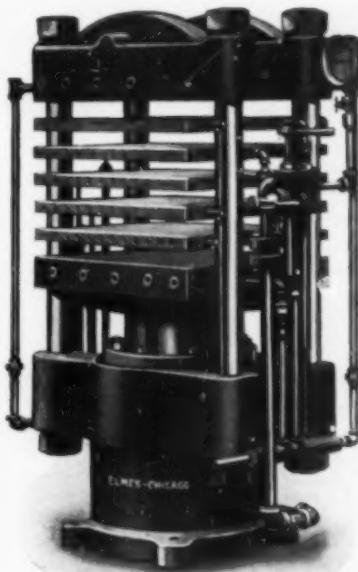
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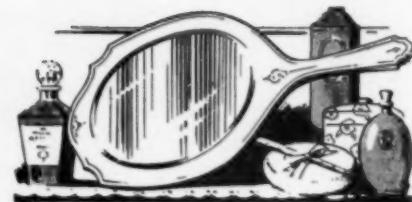
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Vol. 4

MARCH, 1930

No. 3

## The Place of The Molded Handle

Production Efficiency, Attractive Colors and Durable Finish, Cause Many Replacements of Wood and Metal Handles

By Leon V. Quigley

*Bakelite Corporation*

THE use of Bakelite materials is considered and found interesting from several angles as follows:

1. Time and timeliness of use.
2. Originality, or rehabilitation of old design.
3. Related applications, suggestive.
4. Predecessor materials.
5. Salient property conducive to adoption.
6. Inherent property or fabrication adaptability as decisive factor.

One field of phenol resinoid application which has been increasing steadily during the past five years, and which has been developing since the earliest days of Bakelite materials, is that of handles. Percolator handles were early examples. The small coffee pots which one finds in hotels for the service of demi-tasse still have soggy, discolored, and shaky, wooden handles. There is, in

other words, a large field for resinoid replacement of wood in the utensil handle application which has long been conceived, but which requires much more attention.

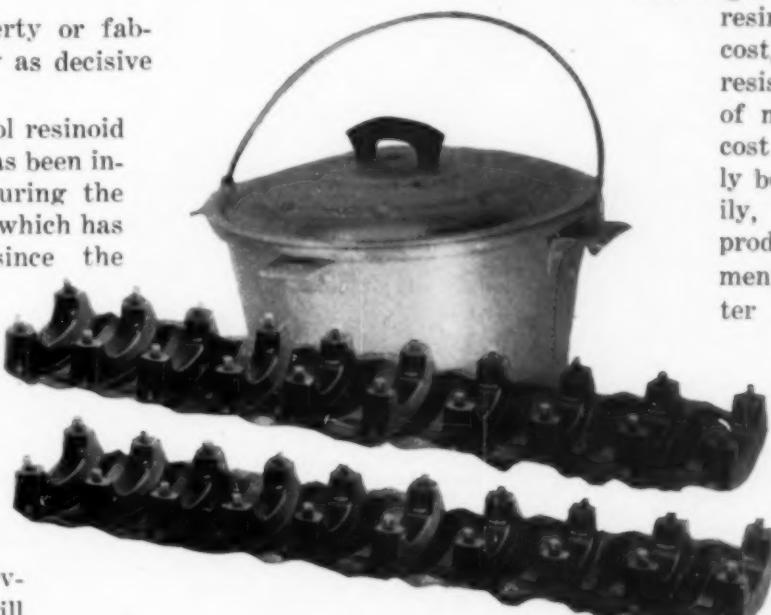
There is little question that for the average pot, pan, skillet, refrigerator, stove, etc., phenol resinoid molding material is better than wood from the standpoint of ease of fabrication, mass production, durability, color,

water-resistance, mechanical attachment, etc. The initial unit cost will undoubtedly be less for wood, though the eventual unit cost from the standpoint of durability and customer satisfaction may not be.

### Mass Production Cuts Costs

Many handles are made from metal which should be replaced by phenol resinoid. In this case nothing is apt to be questioned with regard to the ability of resinoid materials except cost, strength, and heat resistance. On the basis of mass production, the cost question can usually be settled satisfactorily, assuming sufficient production. The development of newer and better materials in the phenol resinoid group has made it possible to provide convincing answers to the questions of strength and heat resistance.

Design is always important, and the potential handle user can make



Mass production efficiency, involving specification uniformity and the incorporation of metal inserts in the molding operation, is well evidenced in the modern manufacture of handles for aluminum cooking utensils.

many minor changes in design which will have a great bearing on the enduring mechanical strength, tight fit, heat durability, etc.

The use of colored materials to distinguish the several control valves or handles has much to commend it. This effect has been secured by only a few companies, but eventually the realization of the advantage will be widespread. Another item which handle designers can well utilize is the property ability of phenol resinoid molding material to incorporate, firmly, metal inserts. The old time pinning, riveting, and force-fitting of handles, can give way to a new era in

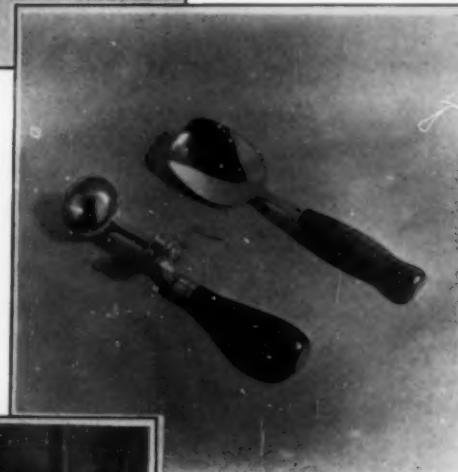
on the floor without shattering or fracturing.

It may now be appropriate to suggest where handles of Bakelite material could be more used. Most emphatically should it be realized by handle clients that there are many varieties of molding materials made by a

Double Boiler with Red, Molded Handles



Ice cream scoops are more sanitary with molded handles; special properties make molded resinoid useful in percolator, lathe wheel, street car strap handles.



All photos courtesy Bakelite Corp.

which metal bushings, threaded inserts, etc., can yield a firm-fitting handle because better engineering principles have been employed.

Handle clients should realize that a resinoid material is optimum only when it has had sufficient hardening through polymerization by heat. Undercure may increase profits temporarily, but will not make for a long-life handle characterized by all the properties which obtain in a fully converted material.

For large handles the fabric-base molding material yields a product which can be thrown



Waffle iron with cover-lift and carrying, molded handles

single manufacturer. Every condition of the proposed use should be listed, and then with the cooperation of the material manufacturer, a molding material of the most adequate properties should be chosen. In view of the conditions of service

and the material requisite, the part should be designed according to the best principles of engineering. If this careful approach be assumed, there is no reason why, eventually, hundreds of pieces of machine shop and power house equipment might not wear plastic handles. So too, it should be increasingly difficult to find anything but a phenol resinoid handle in the kitchen or dining room. Beauty shop equipment, dental chair gadgets, meat market cleavers, elevator control, sink and bath tubs, egg beaters and orange grinders, comptometers and hand organs, should all be future reminders of a thorough-go-

ing, unquestionably efficient, and economically sound use of phenol resinoid handles.

#### Editor's Note

This is the first of a series of articles pointing out the adaptability of molded products in the make-up of useful articles in every day commerce; point out the advantages of molded materials over other materials now used, from either the angle of fabricating methods, appearance or durability; it will tend to bring out what has been done and possibly suggest other applications of molded products.

# It Made You—And Is Waiting to Break You

By **Benn C. Budd**

*Director of Marketing  
O. S. Tyson & Co., Inc.*



THE same factors that have built the Plastic Industry to its present large size are also lurking in the background ready to pull down what they have built up.

Change and competition go hand in hand. But today we think, or should think, in terms of the new competition. By new competition we mean the competition between industries and not between concerns in the same industry.

For instance, before a plastic material can be specified for a definite use the decision must be made in favor of a plastic material versus a metal, ceramic or other material.

#### Changes in Industry

The change factor is extremely high in American industry—which is one big reason why it leads the world. Every day finds old material in new fields—and newer materials replacing others that thought they were firmly entrenched. Metal furniture is replacing wood. Rayon is replacing silk. Synthetic gasoline made from coal is running automobiles. Copper replaced iron and now aluminum is replacing copper—perhaps there is a new material

around the corner which will replace aluminum.

Plastic materials have found their major markets as replacement materials. What about the growing market for plastics not as replacements but as a new material to make new articles from? What percentage of the replacement field has been secured by plastics? Probably not more than twenty-five percent!

Business in the final analysis can be measured in terms of energy. For production energy we use horse power—for financial energy, dollars and for sales energy we use men plus advertising.

The first two, we can easily weigh, measure and compare. But sales energy is an intangible which is impossible to accurately chart for a whole industry. However, we can ascertain the number of salesmen and the number of advertisements at work in the Plastic field.

How much of this Plastic sales energy is being wasted? And what effect has this waste on the total volume of business? Under present conditions at least 50% of this vital sales energy is wasted. And this means that the total volume is just one half what it could be without adding one salesman or advertisement.

This does not for one minute infer that salesmen are lazy or inefficient. Or that advertisements are of a low standard. Strange as it may seem the higher the efficiency under present methods—the greater the waste.

For example, Smith is a high grade salesman for the X Plastic Material Company; Jones is equally good and employed by the Y Plastic Material Company. When they battle over an order from a consumer they utilize a tremendous amount of sales energy. And the better one is the harder the other fellow has to work. Yet only one order can be secured. So half the energy is wasted.

The same is true of a great deal of plastic advertising energy. One ad fights against another.

Energy can be directed. When it is directed against itself there is loss. Therefore it is obvious that it is direction rather than efficiency that is holding the plastic industry down to half its potential market.

There is one word that explains controllability of sales and advertising energy. That word is co-operation. And proof is forthcoming in the fact that sales increases of a whole industry can be measured by the degree of sensible co-operation present.

#### Scope of Market Analysis

Market analysis of broad scope is the first step. Lining up individual production and sales forces to go after the markets—group and individual laboratory work to discover new fields and applications—geographic location of plants and salesmen—a new direction for the informative advertising—all these are but a few of the steps necessary to turn the present sales energy into more productive channels for everybody's profit.

(Continued on page 177)

# Controlling Quality in Molded Products

When all operations in molded articles manufacture are done in one plant, as with Gummon, quality responsibility is fixed

By *S. Pellerano*

*Chief Chemist, Garfield Manufacturing Co.*

WHEN Mrs. Jones returns a broken connector plug with the comment, "I didn't drop it—something just gave way, and here are the pieces", the store clerk from whom she purchased the plug generally can give but a very indefinite explanation and closes the argument with, "It's defective—we will return it to the manufacturer."

And so there is set up in the minds of both customer and clerk the impression that a certain manufacturer turns out poor quality merchandise.

Mrs. Jones represents one customer, and the loss of her business would be negligible. The store clerk on the other hand may influence a dozen or more customers away from that particular make of connector plug within the next few hours, and this result multiplied by many stores and many clerks having similar experiences would ultimately prove extremely em-

barassing to the manufacturer of that particular connector plug.

Hence it is obvious that the maintenance of quality in molding parts for connector plugs, or any other such articles, is of primary importance. Even one little slip in the quality control system established by a manufacturer is apt to find itself reflected and magnified a thousand times before the error is corrected. And such slips are costly, not alone from the standpoint of returned goods to be replaced, but considering as well time lost, machinery to be overhauled, dies to be repaired, or a score of other manufacturing expense items that may be affected.

## Much Depends Upon Quality of Raw Materials

Quality, in the molding industry, is under the control of the molder according to the extent of his operations. If his

raw materials come to him ready mixed, he generally accepts them as represented, and confines his efforts for quality control to the subsequent processes of manufacture. Thus, while he may exercise every conceivable care and diligence in checking, this manufacturer cannot claim absolute control over quality since he depends upon his supplier for the proper mixture of his raw materials; and any variation in this mixture, unless predetermined, is bound to react differently at some stage in the manufacture. Although the difference may be slight it is still there, and quality is open to question. It is beyond his control.

On the other hand, if a molder mixes his own raw materials and prepares them for the molding presses, he has only himself to blame if things go wrong. While this entails another manufacturing division in the factory, together with all the facilities and personnel for properly analyzing and inspecting raw materials, this manufacturer is in a position to exercise full control over the quality of his products, and through a reasonable amount of research work, is able to set up his own standard formulae for certain definite purposes.

As it is the purpose of the writer to cover the subject of quality control from the beginning, or from the purchase of raw materials, he is enumerating here many of the steps taken by his own Company to assure quality according to prescribed conditions. It is assumed that other molders who mix their



A view of Garfield's control laboratory where raw materials are checked, and all subsequent plant operations on these materials are controlled.

own raw materials follow a somewhat similar procedure.

The Garfield Manufacturing Company maintains a well equipped chemical laboratory in which all raw materials, as the shipments are received, are subjected to rigid tests for standards and specifications which have been established as a result of thorough research work and an experience extending over a period of many years. Fillers are carefully graded and prepared to insure definite particle, size, shape and alignment. They are selected as to their suitability for incorporating into the specific binder. Likewise the various binder ingredients are chemically analyzed, and are compounded according to set schedules of time and temperature. As each batch of mix is made up the final binder is checked by the chemical laboratory for viscosity and specific gravity before being added to the filler.

In the research laboratory is installed a miniature factory where new materials and new methods are constantly being tried out. Where experimentation leads to improvement in the product, new revised standards and specifications are set up.

#### Time and Temperature Are Governing Factors

The mixing operation, granted that the raw materials have all been found up to specification,



Regulation of time and temperature in the oven curing of Gummon molded articles are weighty factors in the durability of the finished article.

and the proper compounding of the binder accomplished, marks the first step in manufacture. Again, time and temperature are carefully checked throughout the operation so that there shall be no question as to the uniformity of the molding powder and its readiness for the molding presses. Then the powder is rechecked and tested to meet laboratory standards before it is released to the press room.

A study is constantly being conducted of the different sizes and shapes of dies and their behavior in the pressing operation, so as to determine the most suitable conditions for each with reference to pressure, flow and speed of production; also to insure the highest possible qual-

ity as to strength, hardness and other characteristics desired.

Specifications are recorded for future operations, and observance of these assured through rigid inspection and supervision.

Following the press work comes another operation in which precision must rule, namely the curing or baking of the molded piece. Time, temperature, oven conditions, and the quality of the heat are all determining factors and again the Control Laboratory staff is in charge. Studies are made for each particular molded article so as to secure the best curing conditions to obtain the desired quality standards. Each lot is tested for appearance, size,

(Continued on page 180)



Before each batch of molding material is released, it is checked against laboratory standards.



The original Arlington plant of the Du Pont Viscoloid Company as it existed in 1895.

## A Historical Review of Pyralin

The pyroxylin plastic product of the Du Pont Viscoloid Co. Approaches Its Fiftieth Anniversary

By W. E. Price

*E. I. du Pont de Nemours & Co.*

WHEN a product has achieved the place in industry and commerce such as is held by Pyralin, it becomes of interest to learn something of its early history and development.

Pyralin is a familiar name to millions of Americans who recognize it in the colors of toiletware; in tortoise-shell hair ornaments; in the lustrous pearl of knife handles and boudoir accessories; in the jade of fountain pens; in the porcelain white of bathroom fittings; in automobile curtains and windshields, and in countless other applications. This seven-letter word identifies the du Pont product that chemists commonly speak of as "pyroxylin plastic compound."

### Scientific Development

The complicated process of manufacturing this useful product was neither a simple nor a single discovery, but was the cumulative result of a number of resourceful scientists, each working independently toward different objectives and eventually combining their separate accomplishments.

To the American chemist, John Wesley Hyatt, is given the credit for the practical commer-

cial discovery of pyroxylin plastic compounds in 1870. Prior to Hyatt, however, Maynard, a Frenchman, in 1847; Parker, a Welshman, in 1860, and Spill, an Englishman, in 1865, had contributed essential discoveries in the fundamental processes.

### Industry's Start in Newark

The Newark Evening News of February 7, 1917, presented an interesting sidelight on this question in a story which points out that the inspiration of a billiard ball was largely responsible for the intermediate improvements in pyroxylin plastics. To quote the writer:

"After all, had it not been for a New York billiard ball manufacturer, Newark might not have enjoyed the honor of giving celluloid to the world. The billiard man offered a prize of \$10,000 for a substitute for ivory in the making of the balls. The offer fired Mr. Hyatt's inventive zeal. . . ."

It certainly is a big step forward from trying to invent a material for billiard balls to the activities of the gigantic pyroxylin plastic industry of today, serving as it does every known commercial field in some capacity.

The manufacture of Pyralin dates from about the year 1882, and is the subject of many in-

teresting reminiscences by Mr. Jasper E. Crane, now a vice president of E. I. du Pont de Nemours & Company. His father was one of the founders of the company that first made this product.

In contrast with the large modern factories at Arlington, New Jersey, and Leominster, Massachusetts, it seems a bit strange to think of the original plant as a place where cotton tissue paper was placed in small earthenware crocks and where acid was poured upon the mass and occasionally stirred by hand. The finished product was principally imitation linen sheets for use in making waterproof collars, or else red, white or blue rings for harness decoration; and the best "transparent" sheets of that day had the approximate transparency and color of oil-silk.

### From Ivory to Safety Glass

Always the producers of Pyralin have striven to meet industrial needs by supplying just exactly what the trade demanded. When "Ivory" toiletware was the vogue, Ivory Pyralin set a standard of color, uniformity and perfection of graining that was probably not equaled by any other product except



The present Arlington Works of the Du Pont Viscoloid Company at Arlington, New Jersey. Here great quantities of Pyralin sheeting, rods and tubes, and thousands of sets of toiletware are produced.

natural ivory itself. The position of Pyralin has been maintained in the many adaptations referred to earlier and in the present Pyralin transparent sheets for safety glass which is used in America's foremost motor cars.

The Arlington Company was organized in 1883 and three years later the plant at Arlington was established. The total number of employes in 1891 was less than one hundred and the business was principally confined to the manufacture and sale of collars.

#### The First Catalogue

In 1893 the first catalogue of Pyralin toiletware articles was issued under the title "Ebonized Pyralin", for most of the toilet articles at that time were made of black Pyralin in imitation of ebony. In this catalogue were shown combs, brushes, mirrors, toilet articles, fancy goods and novelties in ivory, tortoise-shell, amber, pink, blue and other colors. Collars and cuffs, martingale rings and loops, amber pipe bits, musical fittings, electrical goods and whiskbroom handles completed the assortment.

Pyralin sheeting at that time

was offered in imitation ivory, tortoise-shell, amber carnelian and a great variety of transparent and opaque colors. The bulk of the Arlington business up to 1910 consisted of the articles mentioned and tortoise-shell sheeting for hairpins and hair ornaments.

About 1910 the importation of quality ivory toilet articles had begun to assume important proportions and indicated that further development might proceed along these lines instead of the previous work of manufacturing products to resemble wood and metal finishes.

The present Ivory Pyralin line was started in 1910 under the trade name "Parisian Ivory." Two years later, however, this name was changed to Pyralin Ivory and again reversed in 1913 to Ivory Pyralin. At that point began the greatest development of the pyroxylin business, for the demand for toilet articles increased tremendously and numerous fabricators came into the field.

About 75 per cent of the business was then in fabricated articles, the remainder representing sheeting stock supplied to

various groups of manufacturers. That was the situation when the du Pont Company acquired the Arlington Company in 1915. Today this condition is reversed. Seventy-five per cent of the du Pont Viscoloid Company business represents sheeting; fabricated articles, or Lucite and Pyralin boudoir accessories, make up the rest.

#### Automobile Windows

Like many other manufacturing enterprises, the growth of this one came about as a result of the expansion of industry in this country. The development and use of transparent Pyralin for automobile windows began to assume important proportions about 1907. Since then it has increased rapidly with the widespread use of the automobile, reaching its maximum during the middle of 1920.

With the great resources and chemical research facilities of the du Pont Company available, progress in recent years has been most notable. In 1925 the Viscoloid Company — another manufacturer of pyroxylin plastics and the foremost American fabricator of toys, novelties and

(Continued on page 179)



The Du Pont Viscoloid Company's plant at Leominster, Massachusetts, where pyroxylin toys, novelties and hair ornaments are fabricated on a large scale. In the oval is a view of the original plant, from a photograph made years ago.

## Cigarettes Stand Up When the Cover of the Molded "Jack" Is Lifted

By no means has the last word been said in the matter of molded smokers' novelties. Calling them 'novelties' is, in a sense, incomplete. True that each device is new and each undoubtedly includes some feature that has not been made part of those devices that have gone on before. But almost without exception, all these smokers' delights have some feature that

makes them permanently useable, placing the article beyond that pale of those transient things that the much-abused term 'novelties' includes.

The new 'Jack-in-the-box' cigarette container that Wm. Demuth & Company manufacture, embodies the lasting structure, durable finish and generally attractive appearance that is commonly and correctly associated with molded articles. It is made to endure. The box carries twenty-four cigarettes which drop down into the box as the cover is closed and spring up into sight, ready at hand, when the cover is lifted. This attractive feature may be made part of the box very readily when the device is molded. In fact, molding an article very often introduces the possibility of novel design and construc-



The Demuth "Smokarette", molded out of Durez, holds twenty-four cigarettes, each in a niche of its own.

tion which might be impossible if the article were stamped out of metal, or made of wood.

This Demuth box is molded out of Durez and is made in several attractive mottled colors; mahogany, red and green, with the outside either an embossed design or having a plain lustrous finish. It retails at \$6.00.

### New Molded Razor Blade Sharpener

A new device to sharpen razor blades of the Gillette type has been put on the market by the Monroe Specialty Company, an instantaneous, automatic sharpener in which a powerful magnet takes the place of stropping, honing, or crank-turning. Before a razor blade is used, the microscopic "teeth" of the cutting edge are in perfect alignment, but after a heavy shave these teeth are badly bent and twisted, each succeeding shave dulling the blade more. The Monroe sharpener restores the blade to its original condition, the factory edge being re-aligned against the glass-smooth poles of a powerful magnet. Molded Bakelite resinoid has been used for the case of this razor sharpener, thus insuring durability and attractive appearance in addition to undoubted utility.



Photo courtesy Bakelite Corp.

The Coty Manicure Tray is a notable addition to the roll of molded products in that it was originally designed to be made of a synthetic resinoid, and not as a later substitute for wood or metal. It is molded by the Colt's Patent Fire Arms Mfg., Co.

## Molded Products and a Problem in Packing and Shipping

WHEN J. N. Schweikert director of manufacturing for the Bryant Heater & Mfg. Company of Cleveland, decided that his shipping department was not keeping pace with the up-to-date methods in vogue in the manufacture of Bryant goods, he decided that the solution was a problem in engineering. So instead of accepting minor improvements that could be made in his own shipping department, he assigned the task of improving Bryant shipping practices to packaging and shipping experts.

Mr. Schweikert's decision has been worth at least \$7,600 to his firm during the year following this action, according to a check-up of the results of changes that were suggested by the packaging engineers. The firm found that its boxes and crates contained excess weight amounting to 75 tons during the course of a year's shipping.

### Research and Packing

Mr. Schweikert believes that many other manufacturers and distributors would profit from a check-up of their shipping practices conducted along similar lines. His first step was to submit various articles of his company's manufacture packed for shipment in the usual manner to a package-testing laboratory. The loaded crates were dropped and rolled in a huge testing drum, simulating in a major way the drops, bumps, sliding and jars that merchandise receives in transit and in varied compression tests their strong points and their failures were measured by recording apparatus and the results of these tests, number of drops before failure or breakage of container, and the point of failure in the side, end, edge and diagonal compression tests were checked by engineers with notebook in hand.

At the end of the first year when his cost department placed before Mr. Schweikert a detailed analysis of the results of this change in containers, he found that his company had made a saving amounting to more than \$7,600 in packaging and transportation costs for that period. Mr. Schweikert remarks the interesting fact that the purchases of the new type of crate during the year also came to the same total. In other words a dollar spent for individually designed containers saved a dollar that had leaked away in wasteful methods under the old system. The entire cost of the new crates had been repaid by the saving they effected, to say nothing of the virtual elimination of loss and damage claims, and the receipt of the shipment in A-1 condition by the consignees.

Several factors contributed to this remarkably worthwhile reduction in the cost of shipping the Bryant factory's finished products. Mr. Schweikert reports that the new crate has a lower first cost than those formerly used as the engineering principles of bridge building which are embodied in its design, save costly material at the

same time providing ample strength where needed for the protection of the heavy metal units of the Bryant line. The Company's First Aid Man had a favorable word in regard to the lessened number of accidents to workers, formerly occasioned by saws, splinters, loose boards with nails, hammering, etc.

There is another item that Mr. Schweikert has not listed in figures but he has by no means overlooked it. The shipment conveys a little more of the goodwill that the Bryant Company would like to send to each customer with his consignment. The customer receives his merchandise in a container that is easily and quickly opened and which has accorded its contents full protection while in transit.

Mr. Schweikert reports his findings with the thought that others may be giving profit-stealing free rides to dead wood. Economies such as those gained for the Bryant Company in a department usually considered far from the productive side of business, can be accomplished only through fact-finding—the scientific laboratory method which is the rule of business of today. They emphasize the triumph of research over guess-work and the rule of the thumb method that all too frequently characterizes shipping department practices.



What packaging engineering achieves: the upper box weighs 50% less than the lower, but it accords equal protection to the same contents.

## NEWS of the INDUSTRY

### Molders Hold Second Buffalo Meeting

THE custom molders seem to like Buffalo, where another meeting of the Molded Insulation Section of the National Electrical Manufacturers Association was held at the Statler Hotel on February 18. Seventeen companies were represented by twenty individuals who attended. It is of interest that the Boonton Molding Co., the Colt's Patent Fire Arms Co., and the Scranton Button Co., the representatives of which were guests at the January 14 meeting, have in the meantime become members of the Association.

John J. Quigley, Public Accountant, of Newark, N. J. spoke of the need of uniform cost accounting methods and made some constructive suggestions based on his wide experience in the industry. Information is to be collected on the present cost methods of the members so that a uniform basis for determining costs and estimates may be established.

The need was expressed for joint industry action to increase the rate at which the business is growing. This was discussed at some length and the experiences of other industries were cited. Further information is to be obtained and the subject will come up again for further consideration and possible action at the next meeting. This will be held again at the Statler in Buffalo on April 1.

#### Name Committee Retires

At the request of the committee appointed to recommend a generic name it was discharged and the subject tabled.

After an all-day business meeting which adjourned about 4:30 p. m. J. B. Neal of the Norton Laboratories, Chairman of the Entertainment Committee, took charge of the party. Mem-

bers and guests were taken by bus across the Peace Bridge to the Pickwick Inn, where dinner was served and all were suitably entertained during the evening.

Following is the list of those present at the meeting: Prescott Huidekoper, American Insulator Corp.; G. K. Scribner, Boonton Molding Co.; P. C. Goodspeed, Boonton Rubber Mfg. Co.; S. Bergner, Edw. F. Bachner, Chicago Molded Prod. Corp.; B. F. Conner, Colt's Patent Fire Arms Mfg. Co.; H. D. Randall, General Electric Co.; C. A. Kurz, Jr., Kurz-Kasch Co.; H. B. Zeiger, Monowatt Elec. Corp.; D. S. Kendall, Mack Molding Co.; H. H. Wanders, Northern Industrial Chemical Co.; G. C. Wilson, J. B. Neal, Norton Laboratories, Inc.; John G. Rossiter, R. A. Austin, Reynolds Spring Co.; R. A. Allen Scranton Button Co.; F. H. Shaw, Shaw Insulator Co.; E. H. Ott, Westinghouse Elec. & Mfg. Co.; Paul W. Hills, Allen-Hills, Inc.; Donald Dew, Die-moulding Prod. Co.; S. N. Clarkson, NEMA.

### Columbia To Manufacture Radio Sets in Britain

LOUIS STERLING, managing director of the Columbia Graphophone Company of England, announces that his company has decided to enter the radio field. The intention is to manufacture sets in the United Kingdom on a large scale.

"It is possible," said Mr. Sterling in an interview, "that as our scheme proceeds as much as £1,000,000 will be absorbed by the new industry here during the next twelve months. Employment will be found for some hundreds of workers."

"The radio business in England has not really started yet," added Mr. Sterling. "Since 1920 the progress made has been so rapid that sets soon become obsolete, and it is not surprising that the public is demanding better radio at much cheaper cost. This is what the Columbia Company intends to provide. In two years from now practically all phonographs, with the exception of portable ones, will be combined phonograph-radio sets."

(Continued on next page)

### American Catalin Sues Imitators

THE American Catalin Corporation, manufacturers of the resinoid Catalin, have instituted injunction proceedings against the Marblette Corp. and the Joanite Corp., both of Long Island City, and various individuals connected with them, to restrain them from using the secret formulae used in the manufacture of Catalin. The motion, argued before Judge Bijur of the New York Supreme Court on February 14th, also requests that the defendant corporations and individuals be restrained from using or selling the secret process; from offering for sale the product of the process, which, according to the New

York Testing Laboratories is identical with Catalin.

The individuals named include Sven Hansen, former superintendent at the Catalin plant and Sven Andreasen, also a former employee of Catalin, both of the Marblette Corp., and Peter Smith, Carl Hader, and Otto A. Hansen of the Joanite Corp. The latter two also are former employees of the Catalin Corp., Otto A. Hansen being a son of Sven Hansen. The American Catalin Corp. seeks damages of \$350,000 from each of the two companies named, as well as the appointment of a master to conduct an accounting of the profits earned. Judge Bijur will render a decision.

# MOLDED BY GENERAL ELECTRIC



**A**S modern as the Telechron itself is this attractive Textolite molded clock case, molded by General Electric for the Warrer Telechron Company. The case, with raised numerals, is fabricated in one piece, coming direct from the molds with its rich walnut finish that will never require polishing or refinishing. It is an excellent example of the molder's art. ¶In this Telechron case—and in all Textolite molded products—are incorporated all the experience and technique acquired by General Electric in producing half a billion moldings. ¶Thus Textolite molded, attractive, durable, dielectric, combining General Electric's unexcelled facilities for research and for production, gives *complete satisfaction* to all users of molded parts.



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#### Columbia Radios in Britain

(Continued from last page)

Mr. Sterling granted his interview just before the annual meeting of the Columbia Company, presided over by the Right Hon. Lord Marks, the chairman. Lord Marks also had much to say concerning Columbia's entry into the radio field.

"We are now manufacturing a combination phonograph and radio instrument," he stated, "and we hope to have it on the market this year. The growth of the radio industry has been very closely watched by us for

many years because of its intimate relation to our own industry, although we have never considered it in any degree a competitive one. On the contrary, we have always contended that radio would increase our business, and our belief has proved to be correct. Our careful investigations and watchful observations of the radio industry have satisfied us that it has reached stabilization, and, that being so, we are convinced that now is the opportune moment for our company to commercially enter it. We have a radio department controlled by techni-

cal and commercial experts of long standing. We have made radio sets equal to any competitive sets now known, and the three models we have just announced to the trade have made us absolutely confident that we can look to a great expansion in this section of our business."

#### Shellac Export of India

Exports of shellac from India for the seven months, April to October, inclusive, of the fiscal year 1928-29 amounted to 336,494 hundredweight (112 pounds), valued at 41,104,915 rupees (1 rupee=\$0.3634 United States currency). The United

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States was the largest consumer taking 188,412 hundredweight, value 22,667,595 rupees; the United Kingdom came second, receiving 64,398 hundredweight, value 7,970,162 rupees; while Germany, an important destination, took 37,346 hundredweight for the value of 4,570,551 rupees.

### Marketing Plastics

(Continued from page 165)

Julius Klein estimates the yearly loss through misdirected marketing and distribution to

be eight billion dollars. Every dollar saved from distribution waste is a dollar *net* profit. And to date nothing has approached co-operation as a remedy. Yes, change and competition made the Plastics Industry—and now they are waiting for a chance to work for some other material and method. But a united co-operating front by all the component parts of the Plastic Industry will give "change" and "competition" and opportunity to work harder than ever for bigger and better Plastic business.

### A Letter From The Ford Motor Co.

To the Editor:—

I am provoked to write this letter because of what in our opinion seems to be very exaggerated statements from one side of a controversy which appeared in your January, 1930 issue of *Plastics*. I refer to that article on "Current Importations of Pyroxylin Plastic Materials are Increasing" by Mr. A. E. Cameron of the Celluloid Corp.

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is entirely a biased statement rather than a true one which would be along this line. With the advent of safety glass and its adoption as standard by the largest automobile manufacturer the demand for volume production of sheet materials of a certain grade was enormously increased. Later, due to determined effort on the part of the pyroxylin plastic manufacturers to deliberately hold up this automobile manufacturer, an arbitrary increase of 28% was demanded. This of course forced the automobile manufacturer to look elsewhere for this sheet material. When it became evident that the automobile manufacturer would succeed in obtaining at least part of his requirements abroad the Pyroxylin Plastic Manufacturers Association immediately filed its brief hoping to stop the importation of safety glass material which was about to begin.

I believe that the point of difference in this may be that the misguided judgment of the Pyroxylin Plastic Manufacturers Association was what brought about this unusual situation and that it occurred at the time of a consideration of a tariff readjustment was a mere coincidence.

It just happens that I am personally acquainted with some of these conditions, and could not help but feel that as mis-statements are unfortunate when published this one by Mr. Cameron is to be regretted.

Very truly yours,  
Ford Motor Company,  
J. L. McCloud.

#### Up With Pyralin

(Continued from page 169)

hair ornaments—was consolidated with the du Pont organization and a new corporation, the Du Pont Viscoloid Company, was formed. The Viscoloid plant at Leominster, Massachusetts, has been enlarged and improved; in fact, an extensive

## GUMMON COLD MOLDING

Research  
+  
Engineering  
Service  
+  
Expert  
Craftsmanship



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**GARFIELD MANUFACTURING COMPANY**  
Garfield, New Jersey

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A glossy black moulded top, threaded to fit on the ground glass cold cream jar.

**KUHN & JACOB  
MACHINE & TOOL CO.  
TRENTON ~ ~ ~ N.J.**



## American Insulator Corporation

NEW FREEDOM, PA.

### PLASTIC MOLDING

### COLD MOLDED AND PHENOLIC PRODUCTS

Peetle

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Commerce Bldg.

addition is now under construction with the object of further perfecting the quality of sheets for safety glass, as well as providing larger sizes than have ever before been produced on a commercial scale.

### In Shoe Manufacture

In 1926, to develop the use of Pyralin by-products, a subsidiary company was organized by the Du Pont Viscoloid Company and the United Shoe Machinery Company for the manufacture and sale of a textile impregnated with pyroxylin. This product is known as "Celastic" and is used extensively in the shoe industry.

In 1927, the Du Pont Viscoloid Company, in association with the Pittsburgh Plate Glass Company, organized a company for the manufacture and sale of non-shatterable glass, under the trade name "Duplate." Glass of this type contributes greatly to the safety of motoring. It has been adopted by a large number of the leading manufacturers of automobiles, and one cannot doubt that Pyralin, one of its components, will become increasingly important in the future development of many American industries.

### Controlling Quality in Molded Products

(Continued from page 167)

strength, hardness and other properties before being released to the finishing department.

Thus, throughout the entire manufacture of Gummon molded products there is a continuous succession of analyzing, measuring and checking procedure without which quality could be neither determined or maintained. Alertness, ability and practical knowledge of the molding business are essential qualifications to which the Control Laboratory staff must measure up to all times for it is not possible to regard quality complacently. New standards are constantly being set up while newer and better standards are to come.



The  
new  
MONOWATT  
Refractory  
Material—

## "Homely as Hell!"

THIS was the endearing tribute which a testing engineer applied to this sample. He had tried to break it in his hands. He had thrown it on the floor. He had taken it to his laboratory and subjected it to heats above the melting point of most metals.

It came out of all his tests in its original form—uncracked and unwarped, and without any indication of structural weakness whatever.

Further tests showed that it was not only a non-conductor of heat within manufacturing limits, but also a non-conductor of electricity.

This engineer knew that it is axiomatic in the molding business that beauty is achieved at the expense of strength and heat resistance. Therefore, when he found that this

new gray refractory material developed by Monowatt met all his tests with something to spare, he paid it the highest compliment he knew by saying: "Homely as hell!"

This Monowatt Refractory Material molds easily to form. It solves the problem of obtaining difficult designs at low cost for use at points of high heat concentration. It is of interest to manufacturers of heavy duty switches, electric furnaces, transformers, high temperature therapeutic lamps, and other products requiring sturdy structure, effective electrical insulation and great resistance to heat.

Remember that Monowatt offers capacity for millions—with prompt delivery—in molded insulation parts, metal stampings, and eyelets for assembly.

This new Monowatt Refractory Material is ready now. Write or wire for samples and prices.

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value*

## Advertisers' Index

Albert and Son, L.	155	General Dyestuff Corp.	152
Aldur Corp.	183	General Plastics, Inc.	131
American-British Chemical Supplies, Inc.	158	F. F. Gilmore & Co.	160
American Insulator Corp.	180	Gray & Co., Wm. S.	184
Bakelite Corp.	129	Wm. Jessop & Sons	143
Becker-Moore Co.	184	Jungmann & Co.	184
Bates & Co., C. J.	184	Karolith Corp.	130
Boonton Moulding Co.	182	Kuhn & Jacob Machine & Tool Co.	180
The Burnet Co.	185	Kurz-Kasch Co.	176
The Burroughs Co.	132	Loomis Co., Evarts G.	144-5
Cambridge Instrument Co.	153	Manchester Mfg. Co.	182
Carpenter Container Corp.	172	Monowatt Electric Corp.	181
Cavagnaro, John J.	145	National Rubber Machinery Co.	160
Claremont Waste Mfg. Co.	185	Nixon Nitration Works	151
Colton, Arthur, Co.	161	Norton Laboratories	178
Colt's Patent Fire Arms Mfg. Co.	188	Peckham Mfg. Co.	184
Diemoulding Production Co.	182	Recto Mfg. Co.	178
Dow Chemical Co.	158	Scranton Button Co.	171
Dunning & Boschart	160	Shaw Insulator Co.	177
Du Pont Viscoloid Co.	135	Smith and Smith	162
Economy Ticket & Label Co.	184	Southwark Fdry. & Machine Co.	154
Elmes Engineering Wks.	161	Standard Mirror Co.	162
Erinoid Co. of America	136	State Chemical Co.	185
Farrel-Birmingham Co., Inc.	144	Stokes Mach. Co., F. J.	156
Flexo Supply Co.	157	Terkelsen Machine Co.	159
French Oil Mach'y Co.	155	Thropp, Wm. R. & Sons, Co.	154
Garfield Mfg. Co.	179	U. S. Industrial Alcohol Co.	134
General Electric Co.	175	Wood & Co., R. D.	156

Say you saw it in PLASTICS

## Custom Molders

See Advertisers' Index for  
Detailed Ads of Molders

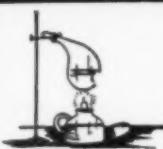
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Manchester, Vt.  
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**Novelties**  
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216 Wallabout St., Bklyn.  
Telephone: Williamsburg 3872

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324 Myrtle Ave.  
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**QUALITY CUSTOM MOLDING**  
**OF BAKELITE**

**DIEMOULDING**  
**PRODUCTION COMPANY**  
CANASTOTA, N. Y.  
Bakelite Moulded With  
Engineering Service

## Exports of United States Pyroxylin Products, By Countries November, 1929

Countries	Sheets, rods, or tubes		Manufactures	
	Pounds	Dollars	Pounds	Dollars
Denmark	...	...	31	264
France	...	...	289	421
Germany	466	530	177	1,618
Greece	...	...	4	33
Irish F. State	106	140	...	...
Italy	93,626	3,708	7	54
Netherlands	...	...	113	232
Spain	...	...	32	307
Switzerland	...	...	7,527	7,722
United Kingdom	106,137	26,969	38,795	63,975
Canada	205,337	153,208	...	...
B. Honduras	...	...	11	13
Guatemala	...	...	522	1,740
Honduras	...	...	35	77
Nicaragua	...	...	88	219
Panama	26	30	249	497
Salvador	...	...	7	30
Mexico	124	80	5,975	10,965
Newfoundland & Lab.	...	...	143	116
Bermudas	395	782	...	...
Jamaica	84	100	8	57
Trinidad & Tobago	...	...	44	22
Cuba	690	667	1,376	2,435
Dom. Republic	...	...	235	508
Neth. W. Indies	...	...	90	246
Argentina	...	...	928	1,613
Bolivia	...	...	458	244
Brazil	...	...	370	1,439
Chile	...	...	61	148
Colombia	...	...	45	272
Peru	469	425	456	758
Uruguay	...	...	193	322
Venezuela	332	364	128	498
B. India	...	...	210	155
B. Malaya	...	...	11	30
Japan	1,447	1,610	...	...
Philippine Islands	182	162	853	661
Australia	6,106	4,512	558	1,217
New Zealand	745	517	29	154
Union of So. Africa	...	...	990	1,427
Total	416,272	193,804	61,048	100,489
Shipments from U. S. to:				
Hawaii	20	13	2,160	3,102
Porto Rico	718	812	2,062	2,729



# Materials for the Plastics Industries



## COTTON FLOCKS of SUPERIOR QUALITY

We are suppliers to all the leaders in the Plastic Molding Industry.

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CLAREMONT, N. H.

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For All Types of Plastic Compositions, Spot and Contract

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## Wood Flour Phenol U. S. P. Formaldehyde

and other raw materials used  
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Chas. F. Elmes Engineering Works

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A. B. Farquhar  
ALADDINITE  
Aladdinite Co.

ALCOHOL  
U. S. Industrial Alcohol Co.

ALDUR  
Aldur Corporation

BEETLE  
Synthetic Plastics Co.

BAKELITE  
Bakelite Corporation

BLOOD  
Jungmann & Co.

CASEIN  
Jungmann & Co.

American-British Chemical Supplies, Inc.  
CASEIN PLASTICS  
Aladdinite Co.

Erinoid Co. of America

Karolith Corp.

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Monowatt Electric Corp.

Northern Indus. Chem. Co., Boston, Mass.  
Norton Laboratories, Lockport, N. Y.  
Recto Mfg. Co., Cincinnati, Ohio  
Scranton Button Co., Scranton, Pa.  
Shaw Insulator Co.

Siemon Co.  
Jos. Stokes Rubber Co.

DIAMOND TOOLS  
F. E. Gilmore & Co.

DUREZ  
General Plastics Inc.

DYESTUFFS  
General Dyestuff Corp.

ERINOID  
Erinoid Co. of America

FIBEROLOID  
Fiberoloid Corp.

FORMALDEHYDE  
Roessler & Hasslacher Chemical Co.

GLASS, SILVERED  
Standard Mirror Co.

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Karolith Corp.

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Terkelsen Machine Co.

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General Plastics, Inc.

WOOD FLOUR  
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State Chemical Co.

This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in PLASTICS. Please mention PLASTICS when writing to these firms.

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## And Now, In Closing:

IT is hard to believe that mergers, in themselves, can be all the balm for Gilead. When industrial disturbances are paramount to profit and serenity, all the purchasing and absorptive power of men in an industry can not make conditions universally better. A merger could possibly cement a few companies to make a more concentrated power; it could not, however, bring about a reconciliation between mind and matter or friends or foes. Conversely, neither can one man, or a group of men, build up an industry because they are spiritual M. D's. It takes brains and money and time. Most of all it takes cooperative thought.

We are inspired in this by the knowledge that so far, although the money and time has been present, to some degree, in and about the molding industry yet the thought and cooperation have been absent. We do not speak especially about the domestic industry, either, although in this country many of the molders are inclined to be too belligerent about their private affairs. In certain European sections the molders are willing to admit their faults (to each other) in an attempt to solve them. Here, they are more inclined to wear their crown of thorns cocked over one eye.

YET no one but a molder can appreciate the actual sweat and hours of toil and trouble that make up the service he renders. It is one of the most exacting, troublesome and—to diverge—ill smelling business we know of. At times it is one of the most exciting. It is certain that the majority of the molders today know ten times more about their business than the men who are swamping them with "advice"; it is equal-

ly true that their clients know nothing about it and should stop meddling with it. If a client wants to mold his own, good luck to him—he'll need it!

THE article we are expecting in Vol. I, No. II of a new monthly—an article on plastics; the monthly on anything from hogs to people—is delayed since the issue has not yet appeared. We have had some hand in the shaping of this article and, never fear, we'll speak about it when it appears!

### And Then, In April:

Several pieces of good reading value are in hand. For the technical reader, the revised standards for exhaustive tests on molded pieces; from the business angle another paper on marketing by Mr. Budd and a third on a large industrial outlet for molded products.

A word for CELLULOSE, Plastic's baby sister. She is interested in permanent adoption by a family of means who will treat her kindly, watch her growth and understand her impulses. She has a distinguished ancestry and over a thousand very important people were present at her christening. There is, however, a subscription lien on her of \$3.00, but it might be possible to have her pay you a monthly visit for even less. Write, as the ads say, for further details.

SERIOUSLY, we are glad to welcome her. She has a room all her own and a private host of admirers. And all the articles she carries so proudly are authentic and original. She is content to leave any cast off (or second hand) things to her imitators, just as Plastics does.

WE almost find ourselves quoting Chem. & Met. for the second month in succession. They view with alarm—but thoughtfully—the many suggested generic names; they even suggest that "plastics" is the ideal one. Congratulate us! It's fine, but we \_\_\_\_\_. Well, we won't take the joy out of life. This very term was, however, brought up a few months ago at a meeting in New York. Thanks to us, that was all that happened.

But, thanks to many outside voices, the industry is being noticed more and more. It will continue to be, for it is basic and sure of success.

WE take occasion to thank a number of our foreign subscribers for their letters on our February Trade Review. Particularly G. R. of London; A. S. of Germany, and the Soc. de P. of France. We feel that such expressions do much to assuage our many doubts as to the scope of interest. Just because we take public notice of it, in this manner, we don't want it to stop. As we've said before, we answered over four thousand letters last year, and we haven't worn our typewriter out yet.

TO continue in a very serious vein, we wish to publicly record our congratulations to the Molded Insulation Section of NEMA, its officers and the new member companies, the Boonton Moulding Co., Colt's Patent Fire Arms Mfg. Co., and the Scranton Button Co., and their representatives. The Association is greatly strengthened, morally and numerically, and can go ahead with much greater faith in the success of its programs. The events of the past few months seem to indicate that this industrial group will endure.